TECHNOLOGY

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Approach

NAVAL AVIATION SAFETY REVI

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ETHING from NOTHING

see page 4

Vol. I

No. 12

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CAPSULE EDITORIAL . . .

Lest our readers think that the concern over naval aviation safety is limited to purely military considerations, we offer the following editorial as a reminder that the results of your effort to reduce the aircraft accident rate are gratifying to a large part of the public.

Editorial Page

The News and Courier

South Carolina's Most Outspoken Newspaper

Charleston, S. C., Monday, April 2, 1956

A STATISTICAL STORY

Thousands of South Carolina parents have sons serving in the armed forces. Many of these youngsters are flyers or have transferred from station to station by air transport. Recent air crashes have caused deep concern for the safety of their sons.

We offer a statistical story that may ease the worries of South Carolina parents. The Navy and Marine Corps, reporting jointly, cite 4.42 major accidents per 10,000 flight hours in 1954. There was a drop to 3.56 in 1955. The fatal accident rate fell from 0.6 percent per 10,000 hours to 0.5 and the rate of individual fatalities from 1.1 to 0.86.

Air Force figures are not available, although spokesmen state the rate of both accidents and fatalities continue to show a downward trend.

That is a statistical story that should please parents.

To which comment* Approach *adds that these satisfying statistics were not the result of a predictable cycle of the type that produces bumper crops. Rather, these rates and percentages are hard-earned proof that a determined, coordinated safety effort pays off. Proof too, that in 1956 we can

Lower the Score Even More!

IN THIS ISSUE

This periodical contains the most accurate information currently available on the subject of aviation accident prevention. Contents should not be construed as regulations, orders or directives unless so stated. Material extracted from Aircraft Accident Reports, OpNav Form 3750-1 and Anymouse (anonymous) Reports may not be construed as incriminating under Art. 31, UCMJ. Names used in accident stories are fictitious unless stated otherwise. Photo Credit: Official Navy or as credited. Original articles may be reprinted with permission. Contributions are welcome as are comments and criticisms. Address correspondence to Director, U. S. Naval Aviation Safety Center, NAS Norfolk 11, Va.
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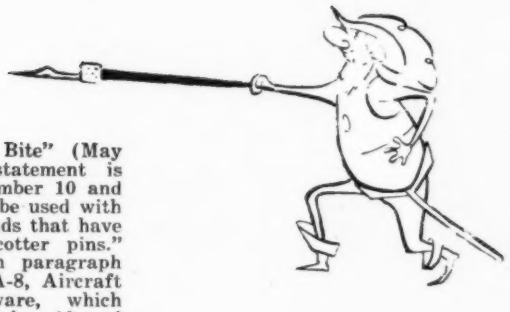
Letters to the Editor



Sir:

In "The Right Bite" (May *Approach*), the statement is made "Nuts of number 10 and ¼ - inch size shall be used with bolts, screws or studs that have been drilled for cotter pins." This conflicts with paragraph 6-12A of ANO1-1A-8, Aircraft Structural Hardware, which permits use of number 10 and ¼ - inch self-locking nuts on drilled point bolts in *emergency* only. Bolt replacement shall be made at the earliest convenience.

Articles of this type are much appreciated because they call attention to little known or easily forgotten facts gathered from many sources.

Lt. R. V. Werner
Naval Air Mobile Trainers,
NAS, Quonset Point, R. I.

You're so right. Specification AND 10068 was our source, and in typesetting the word "not" was left out of "Nuts of the No. 10 and ¼ - inch sizes shall be used only with bolts, screws or studs that have NOT been drilled for cotter pins." Your reference is the latest and permits some latitude. Staff coffee rations have been cut. — Ed.

Sir:

As you know all aircraft manufacturers try to incorporate in new designs, configurations and features that are improvements on previous designs which have proved undesirable. We have found operating difficulties experienced by the services are quite aptly pointed out in many articles of the Navy *Approach* publication.

In the design of our new jet trainer, the Model 73 *Jet Mentor*, many features have been incorporated as a result of previous operating difficulties. We are producing a brochure in which some of these design features are illustrated, and wish to use articles appearing in past issues of publications to point out difficulties have been experienced with previous design configuration.

If possible we would like to have permission to reprint portions of the article, "Foreign Object Damage, Jet Engine Enemy Number 1," appearing in the February 1956 issue of *Approach*. Please be assured we are not stressing design or operating deficiencies of other aircraft, but rather we are trying to stress the advancement of the art through past operating experience, which means a saving in equipment, costs and often lives.

Your approval of this request will be appreciated and we will give credit to *Approach* for each item used. We will also include a statement that use of the article does not constitute endorsement of the product.

H. J. AGNEW
Chief Service Engineer
Beech Aircraft Corporation

Quote freely, Mr. Agnew, your practical and forthright approach in correcting known design and operating deficiencies warms our hearts. If Approach *has helped in some small measure to close the gap between designer and user, our sweat and tears are not in vain.—Ed.*

Sir:

As of 20 March, Fleet All-Weather Training Unit, Pacific, Detachment B, has completed one year without an accident. This represents a total of 14,047 accident-free hours of flight time —a record that can only be accomplished by a highly concentrated effort on the part of all hands of the squadron.

This All-Weather Training Unit, whose mission is to train pilots of operational squadrons in the Moffett Field area in instrument flying to better qualify them in their own type of flying, averages 25 flights a day in all types of weather with the twin-seat TV-2 jet trainer, the T-28B prop trainer, and the SNB-5 *Beechcraft*.

Lt. Comdr. E. N. C. Thompson, the officer-in-charge, emphasizes safety of flight to all pilots and particularly the emergency procedures. Simulated flameout approaches are made frequently by all jet pilots and an accurate record is kept of all the results to insure proper and safe handling of the aircraft under emergency conditions.

The maintenance department, under the able direction of Lt. Comdr. R. O. Reich and a crew of well indoctrinated and trained petty officers and men, keep the aircraft in an up status to meet each day's demand with the maximum of safety. The work during the day is supplemented by a night check crew who work at night to prepare the aircraft for the following day's operation.

A large part of the credit goes to the men in the maintenance department for their splendid record of safe maintenance practices and the overall task of keeping the aircraft in flying status.

Anymouse

Thanks, Anymouse for forwarding the above clipping from the Moffett Field News. *FAWTUPac B can be justifiably proud. Keep up the good work. —Ed.*

Sir:

This Headquarters requests permission to reproduce articles contained in your publication with proper credit lines.

Charles E. French
Major, USAF, Acting
Chief, Flying Safety
Branch, Air Research
and Development
Command

Permission granted gladly. Thanks for writing.—Ed.

Sir:

The article on fuel contamination appearing in the March 1956 issue was viewed with great interest.—Why not paint several of the "V" stripes on the back of the truck the same color as the color of the fuel carried? paint the numerals of the grade of fuel, the same color as the fuel? stripe the last foot, or so, of the hose with a colored tape to match the fuel color? and, paint a ring around the filler cap on the aircraft to match the color of the fuel that is required?

E. H. Zielinski
Capt., USMC

See next letter — Ed.

Sir:

This Story is true,
But luckily for the crew
The airplane never flew;
For with JP-4,
R-2800's no more;
Be careful this doesn't
happen to YOU.

. . . After the very explicit article in the March 1956 issue *Approach* on Fuel Contamination, we had an incident which pointed up everything that the article was trying to eliminate.

We had an FCLP period scheduled for the next morning at 0600 with two planes (AJs) planning to bounce. Maintenance was still working on the aircraft after secure that evening.

The men concerned had been on the job since 0730 that morning working on one of the planes, and when they finished about midnight they gassed up and secured that aircraft. After completing a discrepancy on the other aircraft, they gassed and secured it and themselves. It was now about 0300.

In the morning turnup, one AJ gave only partial power with full throttle. For some reason, probably the recentness of the *Approach* article and an accumulation of omnipotent-thinking aviator-types, they figured that the wrong type of fuel was in the tanks. Investigation proved that the port wing tank was completely filled with JP-4 and that the starboard tank had been topped off with this underpowered octane.

Backtracking showed that the gas chit was made out for 115/145 AvGas and had been dispatched from the fuel pool with 115/145 AvGas truck number assigned; however, the Japanese driver jumped into the wrong truck. When the truck arrived it was obviously dark out and the person fueling the plane had done it so many times and, in addition to mechanical habits, was so fatigued due to the long hours, that he never checked the sign on the side of the truck which said, JP-4.

From this incident several recommendations were generated. One having to do with a more positive control of truck keys in the dispatching system. Other points were to have the sign on the truck made with scotchlite tape so that it would reflect light readily, and that a metal plate be attached to the nozzle of the hose or the hose grounding wire with raised or indented numerals indicating the type of fuel coming out of that nozzle. Of course, the continual stressing of double checking the fuel by the number on the truck and the color of the fuel when refueling is paramount

To amplify somewhat on the above story. On the morning turn-up, the maximum power obtainable from the engines was 35" Hg and 1800 RPM and both engines went about 250° C CHT. The engines were shut down immediately, the plane degassed and all the lines and strainers were drained and flushed with gas. After doing this, the aircraft was turned up and checked okay. But on the second flight, which was from a carrier, the aircraft had to return to Atsugi with the starboard engine feathered. An inspection of the strainers revealed much metal in both engines but possibly the port engine will not have to be changed.

It was very fortunate that one of the discrepancies on the aircraft required the degassing of one of the main tanks, otherwise this plane could have experienced the failure of both engines in flight. Although the pilot would still have the jet, it is unlikely that the aircraft could have remained airborne on the jet only and a very severe accident could have resulted. As it was, the port tank did not contain any 115/145 fuel and as soon as the carburetor and lines were drained by turnup, JP-4 was introduced into the engines. While this proved fortunate in this case, it highlights once again the need for constant vigilance while servicing or maintaining aircraft. This is particularly so when one is tired, for many times haste leads to not only waste but sometimes . . .

M. L. MILLER
Safety Officer, VC-6

Glad to have contributed to a save — recommendations suggested by both you and Marine Captain Zielinski have been forwarded to BuAer for consideration. — Ed.

Letters may be forwarded either via official channels or direct on Anymouse forms. While all letters should be signed, names will be withheld on request. Address Approach Editor, U. S. Naval Aviation Safety Center, NAS, Norfolk 11, Virginia.

B. W. HOGAN
Rear Admiral (MC)
The Surgeon General of the Navy

The Medical Department has a long-standing, major interest in aviation safety. A Bureau of Medicine and Surgery Circular Letter, dated 8 October 1912, set forth the earliest medical requirements for aviator candidates. Since 1939, more than 2000 naval flight surgeons have been graduated from the School of Aviation Medicine at Pensacola and served on the aeronautical organization team. Aviation medical laboratories at Philadelphia, Johnsville and elsewhere are currently absorbed in work which relates to the proficiency and safety of that highly select individual, the Naval Aviator. These provisions for aviation personnel are in addition to the extensive general medical facilities with which the Medical Department cares for Navy men and their families.

One need look no further than the succeeding pages of this magazine to find the proper emphasis on the Aero-Medical approach to aviation safety. Accident statistics indicate that human performance is a critical factor in today's high performance aircraft. Flight surgeons, with the aid of modern medical resources, are dedicated to the task of keeping the aviator master of his aircraft as well as the hazardous environment aloft. The Aero-Medical Department of the Naval Aviation Safety Center is in a strategic position to evaluate and guide our efforts in this endeavor.

At approximately the same time as the establishment of the Safety Center at Norfolk, the medical profession gave recognition to the specialty of Aviation Medicine. Flight surgeons are now eligible for certification by the American Board of Preventive Medicine in this specialized field. Young physicians, who recognize our limitless future in aviation, would do well to consider the interesting, challenging, and rewarding career of the naval flight surgeon.

I note with great pleasure the lowering of the aircraft accident rate over the past few years. Particularly gratifying is the marked reduction in fatalities and serious injuries. The Medical Department looks forward confidently to an increasingly useful role for aviation medicine in the cause of aircraft accident prevention.

B. W. Hogan

The scattered bits and pieces of a crashed airplane often appear to hold no answers to the all-important question of "Why?" Too often, the debris of an accident is regarded merely as a problem of disposal or salvage—the question remains unanswered.

Then again there are times when a trained appraisal, a shrewd eye, a dogged persistence and a patient sifting of pieces and data provide results which are both impressive and convincing—you might say it's like getting

SOMETHING from NOTHING

The F9F-8 came down from 12,000 feet like a bullet. Somewhere along the near vertical dive the canopy jettisoned—the pilot did not eject. The plane drilled into the rocky slope of a mountain and disintegrated.

To the investigating personnel, viewing the five-foot deep hole in the rocky shale and noting the thousand-foot spread of tiny portions of what had been an aircraft, there was discouraging lack of evidence to support any theory. So they looked, they dug, they scraped and picked up unrecognizable parts, sorting them carefully in search of the answer.

This much they knew: During an aerial gunnery flight, the pilot had reported flying tail trouble. Immediately thereafter his plane was observed to enter the dive which terminated in the hole in the mountain side.

That was all. Any further information must come from the wreckage.

So, they dug, and screened, and identified, and after two and a half days a small, laboriously collected group of battered pieces began to take the form of the flying tail actuator. These parts the investigators returned to the contractor for final analysis, but to the experienced eye certain facts had already become evident.

"Why?"

An answer had been found. Note the use of the term "an answer." Certainly no one, least of all a deliberate thinking investigator, might state with finality that *the* answer had been found and submitted to the exclusion of any other possibility.

Nevertheless, these squadron investigators felt that a considerable confidence was justified. With the information they now possessed, *they could duplicate the conditions which led to the accident.*

First, they observed that the trim position at the moment of impact was at the limit of nose-down travel (4½ degrees). This was established by the position of the acme screw with its follow-up fitting. **Please turn the page**

SOMETHING from NOTHING

Continued

Next they established that the stabilizer actuator at the moment of impact was in the full nose-down position (4½ degrees). Note in photo A the bumper stop bottomed on the inside of the main nut of the screw jack.

Then the investigators established that the flying tail was disengaged at the moment of impact. See the marks of the extended shift cylinder spring in photo B.

With these conditions unquestionably established the investigators then turned to F9F-8 Flight Handbook Interim Revision No. 9 which states that recovery from a dive is *not* possible in Manual Control against 4½ degrees nose-down trim. There was the answer to the physical forces which caused the long dive into the ground. The "Why?" of the accident had been convincingly answered.

But there remained the matter of answering another automatic question of "How?". How did the various components find their way into the positions in which they were found in the wreckage? The investigators continued to investigate.

An answer to "How?"

There appeared to be two reasonable and logical methods by which the trim could reach 4½ degrees nose-down, the actuator could reach the full nose-down position and the shift sector to be in the MANUAL position prior to the crash.

A runaway nose-down trim is experienced while operating in flying tail. Opposite stick is applied until the full nose-down trim position is reached, thus causing the trim limit switch to be bypassed. If at this point the pilot shifts *out* of flying tail the actuator will be driven hydraulically to the 4½-degree nose-down trim position, *and the conditions found in the accident have been duplicated.*

Modify this situation, to the extent that the pilot inadvertently introduces nose-down trim, followed by the same sequence of events and again the conditions found in the accident are reproduced.

There were some other ways, yes, such as might involve limit switch failures combined with runaway trim, but each of these implied an unlikely double failure or presumed rather remote possibilities compared with the evidence supporting the investigators' conclusions.

There, except for one final factor was the answer sought. Whether or not the trim variation resulted from a malfunction or was pilot-introduced, one thing was reasonably certain:

The pilot *did* make one mistake which proved disastrous. He shut off the flying tail at the moment when it was the one device available to him to maintain controlled flight. The possible types of trouble with this system are fully discussed in Flight Handbook Interim Revision No. 9, and the correct methods of diagnosing and correcting the troubles are presented therein. In it

Confronted with a rocky hole in a remote mountainside, investigators determined angle of impact from gunbarrel imbedded in rock, and tediously screened for significant pieces of wreckage.

the pilot will note that, for the particular situation considered here, there exists a latent threat in reacting to a control difficulty by disengaging the flying tail. Eliminate the trim possibilities *first*.

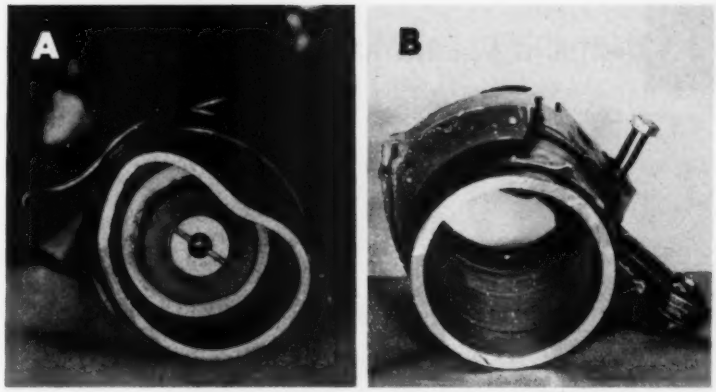
Still One Question Remained

Only one question now remained to be answered: "Why didn't the pilot eject?". As in other aspects of the accident, this matter would likely have remained a matter of conjecture, except for the inquisitiveness of an investigator. The lap belt release, still locked shut, had been located, and nearby was found the torn remnants of the face curtain.

Eyeing this speculatively, the investigator was interested in the tears and cuts on the curtain. On impulse he rolled up the curtain tightly, as it would normally be, and the cuts were seen to match perfectly. Here was proof that the curtain *was still rolled up on impact*. The pilot had never pulled the face curtain. Why? That answer could only be established through a logical reasoning process, and again the investigators believed that one set conditions which might have occurred could be duplicated.

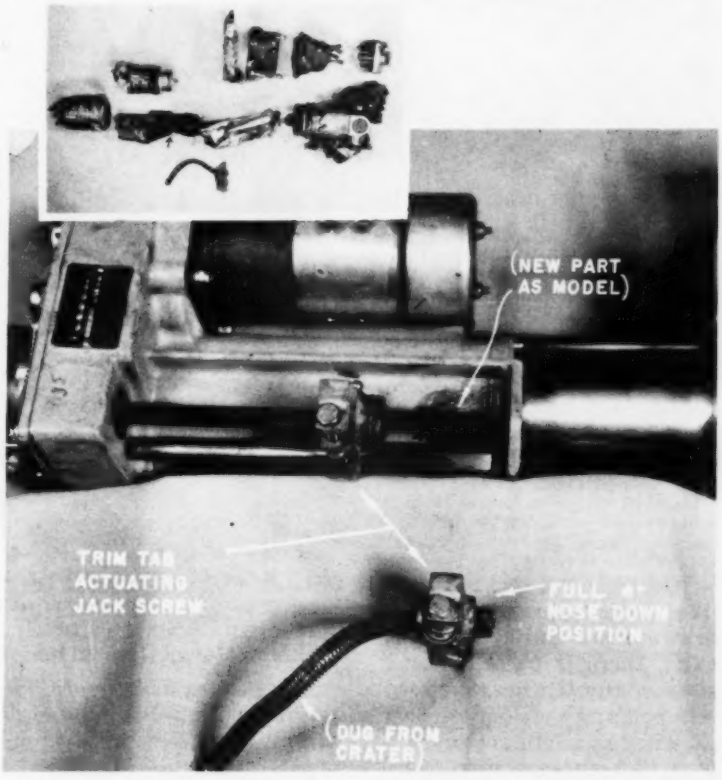
If the pilot's lap belt and shoulder straps were loosened, say for comfort, then the negative G-forces accompanying such a dive as was observed would be sufficient to lift him against the straps. Add to this the windblast following canopy jettisoning, and there existed a situation which would make it difficult for the pilot to reach the face curtain handle.

please turn the page



Evidence obtained from recovered parts such as the jack screw and shift assembly sector, pictured above revealed such important information as the nose-down stabilizer actuator position and that the shift sector position was in the manual position on impact.

To establish the trim position of the Cougar's flying tail at the moment of impact, investigators duplicated on a new actuating cylinder, the position of the movable parts recovered from the wreckage (see insert).



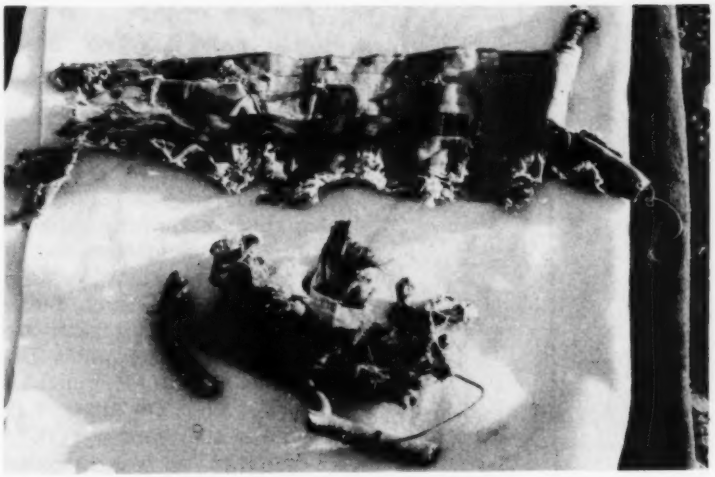
From the smallest rivet, or the most battered piece of wreckage, the accident investigator may gain the answers to his questions of "how" and "why." Valuable technical assistance is often provided by such sources as O & R.

While, obviously, no positive conclusion might be drawn from the evidence at hand, there is gained strong support for the need to keep seat belt and shoulder harness adjusted at all times to a snugness that approaches discomfort—in this case a most persuasive argument.

'Elementary,' Dr. Watson

"There," said an investigator, indicating the face curtain, "is a perfect illustration of potential significance. Looks real simple, sort of 'elementary,' now doesn't it? But except for the curiosity of one individual we might have overlooked something quite important. In this business there's *nothing* which may be considered unimportant."

When all the parts have been collected, as illustrated in this instance of a layout made in a hangar, the investigator's task has just begun.



But for the vigilant eye of a trained investigator, the significance of this torn face curtain might have been overlooked.

An onlooker once inquired: "Who are these flying FBI agents, these Sherlock specialists of the skyways who dig and sift and probe so persistently for the logical cause behind a smoking hole in a rocky hillside? They must be a very select group."

Nope, he might be told, no supersleuths these. Unless you care to consider the average well-trained naval aviator a sort of Detective DIF (duty involving flying). For example, participating in this particular investigation were squadron personnel, representing an average cross-section of squadron experience.

Sharp? Certainly, and shrewd with the awareness that comes with flight experience.

Trained? Of course, to the extent that a pilot may be trained in things other than his primary function as a combat airplane driver.

Intelligent? Enough to recognize that no aircraft accident is a *complete* loss if from it something may be learned which will help prevent *another* accident.

The primary qualification, perhaps, is a refusal to regard a confused mass of busted airplane as a hopeless source of information.

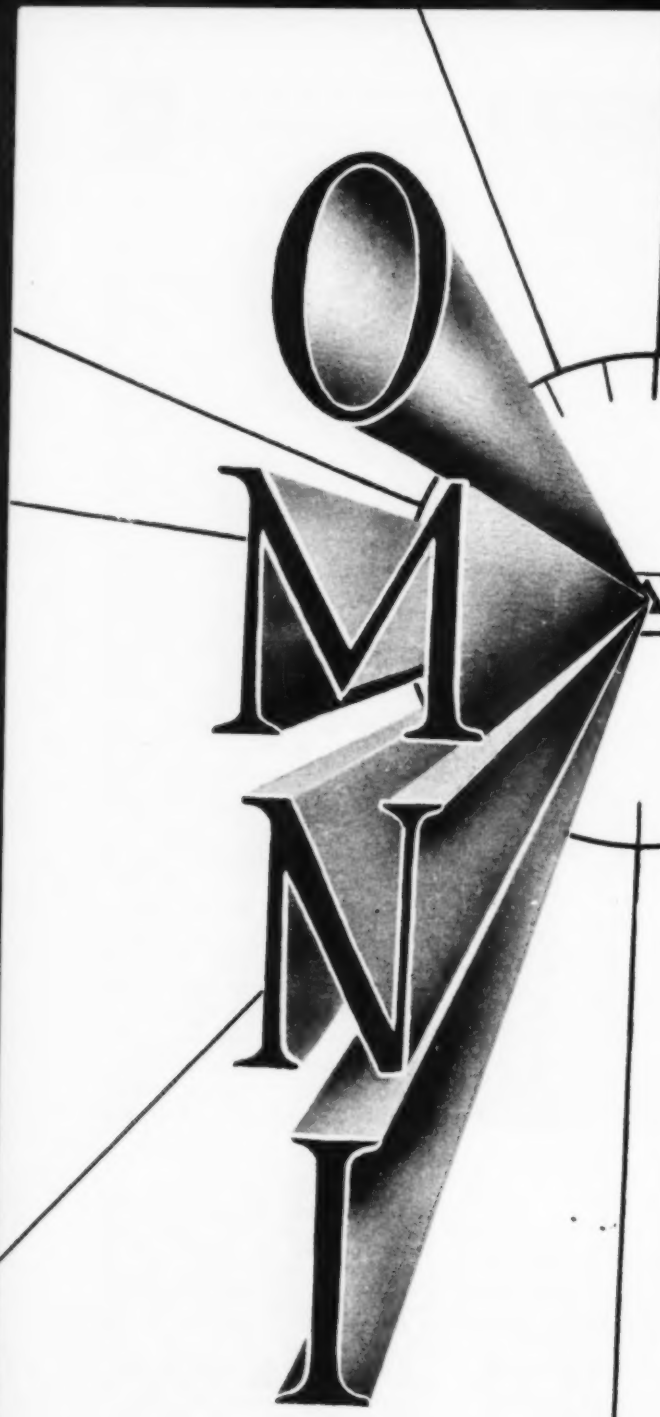
As an individual on the scene commented: "It's often true that the wreckage is so completely demolished that it is impossible to definitely determine the cause of the accident.

"But," he added, "it is a strange occurrence, indeed, when a good investigation does not pay its way in pinpointing the only possible causes and thereby aids in developing the procedures to recognize and correct difficulties where they appear."

And that, it can be added, is quite a dividend in aviation safety!

Since this accident, further investigation has brought to light additional information concerning cross-trimming the Cougar. It is contained in appropriate Interim Revisions to the Flight Handbook: No. 14 for the F9F-6 and 6P; No. 9 for the F9F-7, and No. 20 for the F9F-8.

Also of note to squadron accident boards is the news that a film on Aircraft Accident Investigations (MN 8270) has just been completed by the Naval Aviation Safety Center and is scheduled for release during August. — Ed.



Omni? It's here. And as a naval aviator your chances of coming face to face with an omnirange navigation receiver are increasing. Various utility, transport and multi-engine combat aircraft are now equipped with omni. Development of a kit indicates that VA and VF pilots may have it in the coming years.

At the risk of being accused of joining in the omni-tacan hassle now burning briskly in various corridors and offices throughout the nation, we'll say that omni has obvious advantages over the old familiar 4-course LF ranges. It can take a man-sized chunk of navigation trouble off your shoulders, especially in weather when you are most likely to have trouble.

Operating in the VHF frequencies between 112 and 118

megacycles, omni is line of sight and is relatively free of static, night effect, interference, multiple or bent beams and requires no constant listening to the signal. The omnirange is generally referred to as VOR; from a combination of the initial letters of VHF, omni and range.

As a navigational aid the word "omni" gives a tip to its versatility. Omni is Latin for "all"; thus instead of 4 range legs, the VOR station gives a pilot his choice of 360 legs. In effect, the station sends out a separate beam for each degree of the compass. The omni receiver interprets the signal and tells the pilot where he is in relation to the station.

Incidentally, the omni gear makes a good communications receiver since it covers all civil and military VHF channels up to 135 mc.

At present there are over 400 VOR stations operating along our nation's airways and more are being built. To provide reliable reception at minimum en route instrument altitudes the stations are located not more than 90 miles apart.

Figure 1 shows a section of VOR airways. The airways system is comprised of main and alternate routes. Main airways are normally straight lines between VOR stations. Alternate airways lie out to the side, usually at an angle of 15 degrees from the main airway at the individual station, and are used for lateral separation. The published courses from the stations are termed "radials" and are magnetic directions *from* the VOR stations.

The two models of omni receivers currently in Navy use are the ARN-14 and ARN-30. These models have instrumentation differences but the fundamental operation is the same.

One basic instrument on the panel is the easily recognized cross pointer indicator or course indicator. Figure 2 is a course indicator from the ARN-14. The ARN-30 cross pointer indicator has only the horizontal and vertical needles plus the marker beacon light. The ARN-30 is generally found in the SNB, S2F and R4D and will be discussed later; the ARN-14 in T-28, P2V, P5M and some of the newer single-engine combat aircraft.

This compact instrument combines six functions into one presentation, and, with the necessary control box, is all you need to fly the omnirange. Only three items on the instrument will be of interest to the pilot concerned with the fundamentals of omni.

First, there's a vertical needle which is correctly known as the flight path deviation indicator (FPDI) as this most accurately describes its function. The needle moves right or left to show which way the pilot's desired heading lies. Courses or radials transmitted by the station make a fixed magnetic track across the ground and when the needle is centered, the aircraft is geographically "on" that bearing.

Next item is the selected course window at the top of the instrument. The numbers appearing in this window are the degrees of the bearing selected by the pilot and are con-

Please turn over a new leaf

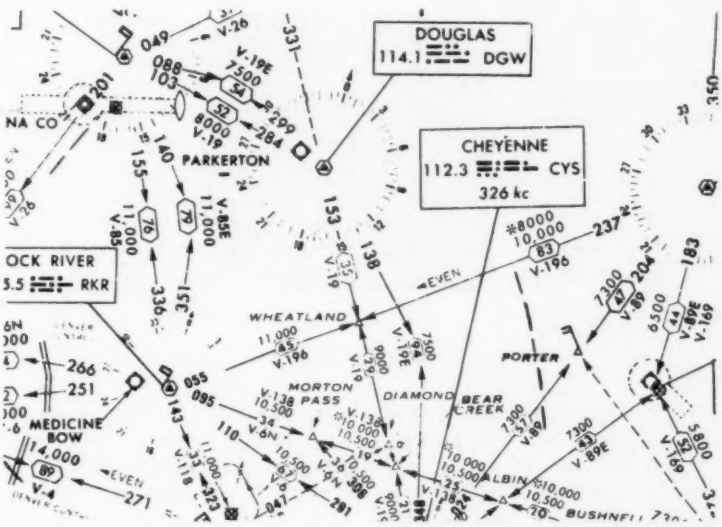


Fig. 1. Near a major terminal the VOR chart begins to look cluttered, but look at the available routes. Preflight planning will eliminate most of your confusion on cross-country hops.

OMNI Continued

trolled by an omni bearing selector knob at the lower left corner of the ID-249.

Last, there is a To-From indicator on the left of the course indicator instrument. In this window the word TO or FROM will appear depending on whether the pilot-selected bearing is to the station or from the station to aircraft. *It does not indicate whether the airplane is going to or from the station.*

It's important to remember that an omni receiver can't tell you anything about which way you are headed, nor does it care. It can only tell you where you are—this information comes in handy even if you do like egg in your beer.

Perhaps the best way to untangle the elements of the course indicator is a short simulated flight. Put yourself at 10,000 feet with the low frequency gear out. Without VOR a situation like this requires map reading or D/F steers to get home.

Omni makes it easy.

Turn on the omni receiver and crank in the station you are nearest to or to the station you want. In this case let's say you want to fly to Douglas VOR, north of Cheyenne.

If the VOR RadFac charts are available, finding the frequency is simple. If you don't have them, the information can be found in low frequency RadFac charts. Omni stations are marked with a small hexagon. The frequency is in the printed material opposite the individual chart.

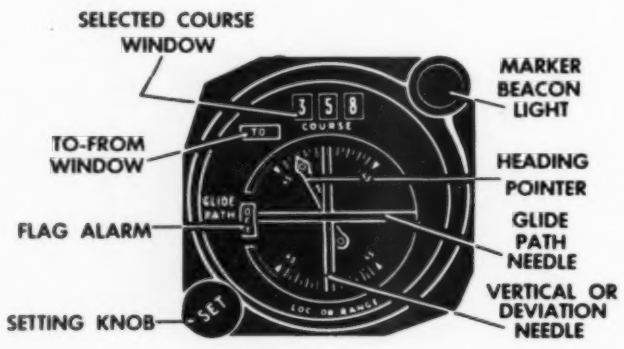


Fig. 2. A course indicator from the ARN-14.

Another source is the various navigational charts. Every chart now carries VOR information. Just look for the blue tinted compass rose and radio information box. Even without charts you can find the desired frequency from the H.O. 510 reference section in Vol. 1. This section lists VOR stations by identification, location and frequency.

Once tuned in, check the station identified as in a low frequency range. Some stations have an automatic voice identification which is repeated each 15 seconds.

Whether you are in actual flight, in a Link, or just doodling, a good bet is to plot your approximate position once you are oriented. If no letdown plate or RadFac chart is available even a simple sketch of a compass rose will make it easier to visualize your position and keep ahead of the airplane.

With the station tuned in, the red alarm flag over the vertical needle will disappear. Marginal operation is indicated by fluctuation of the flag. If this is due to a weak signal it should improve as the station is approached, or if in mountainous terrain climb to a higher altitude. At maximum range the voice identifier may be weak or unreadable. There is no halfway receiver operation with omni. If there is no flag showing the set is receiving reliable navigation signals.

Now, to orient yourself. Turn the omni bearing selector knob until the vertical needle moves into the center. When the needle is centered, check the to-from window. If it reads TO, simply turn the aircraft until the compass or gyro headings agree with the heading which appears in the window at the top of the instrument. You are now heading for the station. It's that simple.

Should the to-from window read FROM, rotate the omni bearing selector 180 degrees and the window will then read TO with the needle centered. Again, all you do is match the aircraft heading with the bearing set in the course indicator and you are heading for the station.

This type of orientation makes omni easy for the pilot who doesn't get a chance to

use it often. You can always fly to a station by following the basic steps listed above.

There are several points which will make flying the omnirange easier if you read them here—easier than finding them out after weaving back and forth across the sky chasing the vertical needle.

Let's take the orientation illustrated and continue on toward Douglas. Assume that the needle centered when the bearing selector was turned to 005 degrees and that the to-from indicator read TO. That puts you south of the station (see Figure 1). You turn to 005 degrees to get to the station but after a short period the needle begins sliding over to the left due to wind drift; the needle doesn't tell you how much to turn, it simply indicates that your desired track lies to the left.

With the setup now in the cockpit the omni sensing is normal, that is, the course selector agrees generally with the aircraft heading. Consequently you correct *toward* the needle to intercept the desired course. If turns of more than 20 to 30 degrees are made when the needle is off center just slightly, the chances are that the desired bearing will be overshot each time. Just do it like you would intercept a low frequency beam which is close aboard.

When the needle is recentered a drift correction angle will keep it centered. Actually, by keeping the needle centered the plane automatically crabs the proper amount to hold a desired track. Start correcting the moment the needle begins moving away from the center.

Now that you are oriented and have the wind drift taken care of, you call Douglas radio. Let's suppose Douglas clears you to the station via Victor 19, an omni airway leading into the station from the south. Your position right now is close but you will have to move around to this new area.

Looking at Figure 1 we see that the radial for Douglas is 153 degrees. Radials are outbound headings so we can take the reciprocal for an inbound bearing.

Fig 3. With the aircraft at A, the needle can center only when the omni bearing selector is set at 270 or 90 degrees, regardless of the plane's actual heading. If you can figure what bearing will center the needle at B, you can fly omni.

Turn the omni bearing selector to read 333. Turn the aircraft to this heading also. The vertical needle will make a full deflection to the right as the desired course is over 10 degrees to the right. The to-from indicator will still read TO the station so just correct toward the needle again.

Flying toward the needle doesn't mean that you start a right turn and expect the needle to start moving. It will stay pegged to the right. Here's where previous experience in instrument work comes in handy. Just imagine you are trying to intercept a low frequency beam whose inbound bearing is 333. If you've plotted your approximate position on a kneepad or chart, visualizing the heading to take up is not too difficult.

If the desired radial is not too far away, within 40 degrees of your present position, one method is to double the angle of difference between the present radial and desired radial. In this case the angular difference between our course of 005 and the desired inbound heading of 333 is 32 degrees. Doubling this and adding it to the course of 005 gives an interception heading of 69 degrees.

As the aircraft approaches to within 10 degrees of the inbound bearing the vertical needle will begin to move to the center again. Now is the time to begin planning your interception of the bearing. As the needle begins moving steadily toward the center make a left turn to intercept the bearing.

With the needle centered,

Please turn the page

the to-from indicator reading TO, and your compass or directional gyro reading the same as the selected course, you can sit back and wait for station passage.

Station passage in the VOR system is recognized by a so-called cone of confusion. On passing the station the to-from needle will move and read FROM with the vertical needle fluctuating from side to side. The indications may change several times before stabilizing.

It's also possible to get an indication of station passage from the identification signal. For a few seconds the tone has a hoarse sound with a slight buzz in the background.

One important point must be mentioned here. When the station is passed the to-from indicator changes, and the sensing of the receiver is automatically changed. You still make corrections toward the needle to regain the desired bearing. In our example you continue away from the station on a bearing of 333 and if the needle swings to the left you correct to the left. No change in instrument setting is necessary.

But, should you turn back to the station and fly the *reciprocal of the bearing* shown on the course selector, corrections must be made *away* from the needle. This procedure is undesirable and should not be used. To eliminate confusion set the new heading desired on the course selector. In this case it would be 153. Crank this in and the to-from indicator will change to read 153 degrees TO the station.

If equipped with the ARN-30 your instrument panel will have the two instruments shown in Figures 4 and 5.

Fig. 4—A cross-pointer indicator for the ARN-30; the "off" flag at the bottom retracts from view when a usable omni signal is received.

Fig. 5—A course selector from the ARN-30. In this case the selector course would be 150 degrees. The To-From indicator is centered indicating that the equipment is not operating.

The course selector is manually operated by the knob on the lower right-hand side and any desired course from 0 to 360 degrees can be selected. The To-From indicator is the small window appearing in the top half of the course selector. In operation the pointer bar moves up or down pointing either to the word "to" or "from."

So far, no mention has been made of the radio magnetic indicator (RMI) which is nothing more than an omni ADF. The RMI requires an input from a flux gate or gyrosyn compass. Some Navy installations do not make use of this ADF feature, especially with the ARN-30. For example the S2F had the RMI indicator but it is used for the UHF D/F.

When the RMI is linked to omni, normal ADF procedures, such as tracking, holding and letdowns can be accomplished without special technique. These maneuvers can be done without the RMI. Using only the course indicator, prior practice is necessary before an actual omni letdown should be attempted. Approved VOR letdowns are in use by many airports and the letdown plates are included in the H.O. 510.

Even without RMI the list of things omni can do is pretty impressive. Figure 6 shows how to get ground speed checks with a little preflight planning. Time and distance checks can be made as illustrated in Figure 7.

Use VOR bearings to check your position during a cross-country. Or if you get lost (horrible word) and want to fix your position without flying to a station, use bearings from several VOR stations. Navigating directly between VORs or to any point within VOR coverage is equally easy.

A list of points useful for pilots planning cross-country flights via Victor (VOR) airways follows:

● Within a radius of 15 miles from the station where the airways converge, ATC will employ altitude or

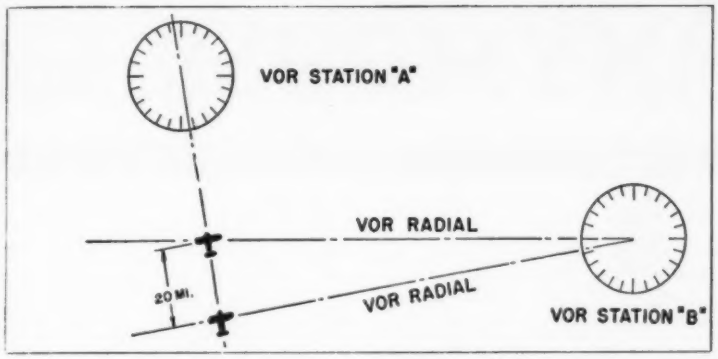


Fig. 6. Computing groundspeed from radials of the VHF omnirange. A simple procedure to check the aircraft groundspeed can be carried out with the aid of a VOR receiver, a compass, and a watch, as shown by the above drawing. First the pilot selects the 260-degree and 270-degree radials from station B, which intersect the radial from A on which he is flying, notes the mileage between intersections from the mileage scale on the chart, sets the bearing selector to the 260-degree radial from B. At the top he notes the time when the deviation indicator centers on the 270-degree radial from B, and using the formula or computer, figures his groundspeed at 100 mph.

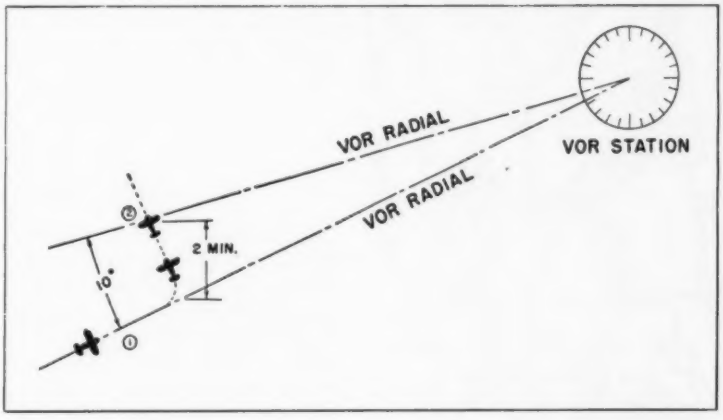


Fig. 7. Computation of time-to-station. The VHF omnirange provides the pilot with the ideal method for determining the time-to-fly to a station. At point (1) the pilot tunes to a VOR station and obtains the bearing to the station, turns 90 degrees to the bearing, rotates the bearing selector until deviation-indicator needle centers, and notes the time. He presets the bearing selector ahead 10 degrees and holds his compass heading. When deviation-indicator needle again centers (at point 2) the pilot notes the time, computes time for the bearing change (elapsed time). Using formula, he then computes time-to-station.

time separation.

● Fly even-numbered Victor airways, eastbound at odd thousands; westbound at even thousands.

● Fly odd-numbered Victor airways, northbound at odd thousands; southbound at even thousands.

● Odd and even indicators are shown on the RadFac charts.

● Where colored airways and Victor airways overlap, the odd or even rule for the appropriate color airway will apply.

● Where even-numbered and odd-numbered Victor airways coincide the rule for even-numbered airways will apply.

● When copying clearances for Victor airways be especially alert to the route specified. You may have requested the regular route but be cleared via an alternate route.

● Fly the centerline of your assigned radial and stay within 3 degrees of the on-course as indicated by the vertical needle.

● Do not confuse inbound bearings with VOR radials. VOR radials are courses identified by their magnetic direction from the station.

● Warning of maintenance at CAA navigation aids is indicated by the absence of station identification, either voice or coded. The facility may be unreliable even though on the air intermittently or constantly.

● The Supplementary Flight Information document lists various stations throughout the U.S. which provide a VOR receiver check signal. Airline procedure is to check VOR receiver every 10 days or 10 hours of flight.

● When planning a flight via Victor airways always check the latest and past issues of the Airman's Guide. Certain minor irregularities may be listed for a particular station which could hinder your navigation. Here are some sample entries: "VOR courses 360-70 not usable acct course bends and roughness; not usable beyond 15 mi acct scalloping; only airway radials flight-checked."

● Check the JEPCO Aviation charts when using the VOR in mountainous terrain. Some airways will have two published altitudes with the lower altitude followed by the letter T. This altitude is the terrain clearance altitude. The higher altitude is the minimum altitude at which reliable VOR signals can be received. ●

ANYMOUSE and h

FOGGED CANOPY

"It was half light and half dark when I began taxiing my F9F-5 out to the runway" said Anymouse. "My canopy was fogged although I had tried to wipe it off a couple of times. By mistake I used a taxiway that was not completed from the apron to the main taxiway and I ended up with all three wheels sitting in soft dirt.

"The moral seems to be to get the canopy clean before taxiing. And also, be especially careful when it's light enough that you think you can see and dark enough so you can't. Don't rely on obstruction lights alone to warn you of ground hazards."

HANDLE WITH CARE

"Approximately 15 minutes after rendezvousing from an overwater rocket/bomb period in an S2F, our wingman informed us that it appeared to him our wing lock warning flags were exposed, indicating that our wing-locking straps were not locked into place.

"Indeed they were not! A quick check in the cockpit proved that the T-handle on the overhead console was DOWN and not flush with the console as it had been on the preflight check.

"The T-handle either vibrated down or was forced down by the G forces involved in the rocket runs; due to the fact that it had never been locked. In this particular aircraft the action of the handle had proved in the past to be very critical, actually requiring it to be pushed past the level of the console surface to become properly locked in place.

"While this condition could be peculiar to this particular S2F, it is necessary for the

his hairy tales

Anymouse reports are submitted by Naval and Marine Corps aviation personnel who have had hairy or unsafe flight experiences. As the name indicates these reports need not be signed. The purpose of Anymouse Reports is to help prevent or overcome dangerous situations. Forms for writing Anymouse Reports are available in ready rooms and line shacks. All reports are considered for appropriate action. Send reports to the Naval Aviation Safety Center, NAS, Norfolk 11, Va.

pilot of any S2F with the flag type lock warning system to insure the locking strap is secured. This is done by forcefully thrusting the T-handle in place and proving that it will continue to stay locked by exerting downward pressure on it to insure the little trigger lock is engaged.

"We got back but it was the lo-o-ongest 80 miles we ever flew

SHORTCUT?

Weather was 1600 feet overcast with visibility 2 miles in haze. Anymouse was one of a flight of 4 *Banshees* making a standard allweather penetration on the Fentress homer near Oceana, Va.

The penetration was going normally when, Swoosh! Number 1 F2H at 1500 feet altitude went by a P5M. Number 2 aircraft missed the boat with less clearance even after a radio warning by number 1.

Anymouse commented that at 250 knots and in marginal weather, there is no time to avoid other aircraft in the instrument approach lane while concentrating on instruments after a 4000 fpm descent.

The area in question is within Norfolk control area which requires three miles visibility if flying above 700 feet above the terrain. Maybe the big bird was trying to sneak home without regard for CAR 60. Could have been a fatal shortcut.

ZOOT SUIT

"I made four normal catapult takeoffs from the carrier. On the fifth shot my G-suit started inflating and the pressure kept increasing. I immediately tried to disengage the connection but the pressure was so great that I had difficulty in doing so.

"Before I was able to disengage the connection the pain was quite critical and my movements were restricted. Once the connection was disengaged I was able to continue with the CarQuals."

ONLY 10,000 OFF

"While in a TV-2 during a night hop I was cleared by Long Beach approach control to descend VFR on the southeast leg of Long Beach radio, to hold southeast of Huntington FM at 5000. At this time I had 1800 pounds of fuel.

"While holding I was cleared to switch to GCA and contact them for a GCA to Los Alamitos. Voice contact was alright but they were unable to pick me up on radar. As soon as I got down to 900 pounds I requested a VFR descent to land at Los Alamitos.

"In letting down I found out why GCA was unable to pick me up. I had been misreading the altimeter and was at 15,000 feet instead of 5000 as I had reported. I called NAS tower and told them of my mistake."

(The search radar used in GCA, because of its antenna design, transmits a peculiarly lobed pattern which levels off about 5000 or 6000 feet above the terrain.)

Some people call the old altimeter the most dangerous instrument in the cockpit. —*Ed.*

More on the next page

THREE BLIND MICE

Three HRS helicopters departed on a routine VIP commitment in below minimum weather. Due to rain, actual visibility was about 100 yards and ceiling about 200 feet.

No briefing had been held as all the pilots had carried out the previous portion of this commitment. After climbing out to about 100 feet the flight felt their way around hangars and hills at an airspeed of 25 knots. Getting into the clear, as one pilot put it, the air craft boomed out at 35 knots in one-quarter mile visibility.

Following the coastline the trio of 'copters straggled along in a modified column formation, steadily dropping altitude down to 75 feet. Nearly to their destination the lead helicopter was forced to turn sharply to the right to maintain visual contact with the coastline. Then to avoid a hill he changed coarse to the left. Number 3 helicopter was forced to pull up to prevent overrunning the flight, and when he pulled up he disappeared into the fog.

Number 3 was now on instruments in a solid overcast. The first two helicopters continued to their destination and landed.

After several steep climbs and descents the pilot of number 3 found himself at 1400 feet, zero airspeed and gyro horizon tumbled. More gyrations followed and the pilot regained partial control in a 60-knot glide. About this time the crew chief spotted a patch of land.

The pilot descended, gained visual contact and discovered the aircraft was right next to the shoreline. A decision was made to continue on to the destination but Anymouse reported, "after a minute or so a clear place to land was spotted, and we did so."

"I never thought I'd be glad to have mud in my shoes," he continued, "but, I was never happier in my life than when I stepped out of the plane and the mud oozed into my shoes.

"A telephone was located and the base informed of the helicopter's whereabouts and intentions. Know what we found out?

"The flight had been canceled the night before but no word was passed on to the squadron until after the flight had taken off."

Could something like this happen in your command ?—Ed.

POST MORTEM

Taking off in a TV-2, Anymouse felt a slight buffet as he cleaned up his plane and accelerated. At 265 knots he throttled back and rechecked all indicators and handles. Recycling the gear had no effect as the buffeting became more severe.

"I decided to abort the hop," said Anymouse, "meanwhile keeping the speed below 210 knots and climbing for altitude. The most pronounced effect was in the rudder pedals. It felt as though someone were striking the rudder first on one side and then on the other. Slowing down to 150 knots had small effect on the buffet.

"I checked the stall speed and found she still flew at 98 knots so I decided to land. Burning the tips down to 80 gallons each I entered a high circling approach.

"At about 300 feet altitude near the approach end of the runway the nose began yawing 20 to 30 degrees to each side. When queried, my passenger said he wasn't on the controls so I crossed my fingers and continued the approach. I touched down on the first third, taxied in and shut down.

"During a careful examination of the aircraft I heard a strange rattle as the plane captain depressed the starboard blow-in door. I got on the right wing and lifted the right plenum chamber access cover.

"It hadn't been fastened and I had overlooked it in my preflight. If it had torn loose it could have damaged the tail sufficiently to cause a good deal of control difficulty.—Preflight, preflight-preflight!"

One instructor and his student weren't so lucky.—Ed.

ADD 10 PERCENT

"Although the tiptanks were supposed to be gassed, I found they were not when I went to my F2H-2 after filing my IFR flight plan," began Anymouse.

"To wait for tip fuel would have meant a delay of approximately one hour. As I would have had to refile I nixed this, having made the trip before without tip fuel. Of course the previous flight had been made VFR. I assumed I could do it with equal ease during moderate instrument conditions. What I didn't take into consideration was the fuel that would be required for an instrument climbout other than on my course."

"My second error after proceeding on course and knowing my fuel reserve was greatly reduced, was in not landing at one of several military fields available. Forced to make an emergency descent at my destination I landed with about five minutes fuel remaining. If weather conditions had closed in, as they did about two hours later, I would have been in serious trouble.

"My conclusion is that there is no comparison between fuel requirements for visual and instrument conditions. No routine flight is so important, or time so valuable, as to endanger yourself, your plane or others by pushing your own or your aircraft's capabilities to the maximum.

"Figure what you need under the worst conditions, add 10 percent, and then go. Not before then."

HEADMOUSE

Headmouse:

Good records are one of the prime components for good maintenance and safety.

I find log book form 418 very difficult to maintain with any degree of consistency. Instructions as given in BuAer NavAer 00.70 of 22 November 1955 are inadequate and confusing; check with BuAer Notice 3760 dated 5 May 55 and you will find a list of log-keeping discrepancies, some of which are used as examples for properly filling out the log sheets in BuAer NavAer 00.70. See item e(4) paragraph 3, page 2, BuAer Notice 3760, compare with example on Page 19, exhibit H of NavAer 00.70—Items 254,255,256.

It is insisted that all entries be listed consecutively. You follow this procedure and later a supplemental copy of the directive will be received only with the letters A, B, or C added, neither one cancelling the other and you will find that numerous consecutive entries have been made since the original and between the supplemental directives; an example of this may be had with F9F Service Charge 237, 237A, 237B, 237C. What do you do? The instructions in NavAer 00.70, Page 19, exhibit "H" gives no indication on the procedure to enter a technical directive that is marked "NA" in the status column. How can the responsibility be fixed for marking it "NA"? What to do if later instructions, either directive or letter nullifies the original reason for marking it "NA."

Should the status column be filled on receipt of directive or upon the completion of the work as listed in the directive?

The column entries for the status "PI" is not explained and the example is not clear. How is it known that VF-30 incorporated the directive? Where did they get the date incorporated?

These are just a few morsels of cheese the headmouse can bite into—from the scent there is a big hunk there somewhere.

Anymouse

We bit into it and find instructions contained in NavAer 00.70 supersede others concerning log book maintenance. BuAer says procedures for verification of Service Changes will be clarified in a forthcoming revision as will instructions concerning "NA". Suggestions for improving this instruction are welcomed and will be considered for inclusion. Write BuAer, attention MA-334.

Headmouse:

Would you please clarify a question for me? On a jet cross-country flight pertaining to the 25-minute fuel reserve over the destination. Is the reserve to be computed as cruise altitude or at minimum en route altitude? For example, a jet with 25 minutes of fuel at cruise altitude may have 3000 lbs. in reserve where as at minimum en route altitude the same reserve would be 1500 lbs.

As to being in black and white, local attempts to find the solution have failed. Upon questioning pilots I received both answers one of which is very much wrong. Your help would be greatly appreciated. — SSgt Leonard S. Cushing, Operations Section, MARTD, MARTC, USNAS, South Weymouth, Mass.

Chapter 12 of the new All-weather Flight Manual which is in the process of being printed and distributed states: "Current instructions require 25 minutes of fuel for holding, computed at normal cruise fuel consumption at cruising altitude." Although no directive is quoted and the new manual is not yet widely distributed this should provide an authoritative answer.—Ed.

Safety Council Notes

Midair Collisions, in ComAirPac—12 midair collisions that have occurred between July 1955 and February 1956, 15 aircraft have been destroyed, 7 pilots were fatally injured. A conservative estimate of cost of these accidents is $6,150,000. — *ComAirPac Consolidated Aviation Safety Council*

New Pilot Training—The attention of commanding officers was called to several recent accidents which were the result of the mechanical flying of new pilots. Pilots who have recently been received should be closely observed for such tendencies, and for the use of techniques carried over from previous training which are not applicable to service-type aircraft. — *ComFAirJax (NavAvSaf Council Southern)*

A Flight Surgeon Responsibility—It is the responsibility of the flight surgeon to check the health records of all his pilots to make sure that each pilot has had a flight physical examination within 12 months of the time he actually controls aircraft. Furthermore, it is most important that each flight surgeon be acquainted with the personal characteristics of his pilots both during duty and off duty.—*Chesapeake Area Aviation Safety Council*

Gunnery Pattern Accidents—NAS Kingsville, is evaluating a 3-plane versus the 4-plane pattern as a possible solution to the problem of accidents in the gunnery pattern. Initial reaction is very favorable to the use of only 3 planes.

Several of the midair collisions in NAVanTraCom have occurred during tactics engaged in going to and from the gunnery area. Instructors were cautioned to use judgment and not engage in maneuvers that the students were not completely ready for.—*NAVanTraCom Aviation Safety Council*

People Plus Hardware Equals Accidents — A statistical summary of aircraft accidents within AirLant during calendar year 1955 reveals that the human element entered into 68.85% of all accidents. This is broken down as 63.66% attributed to pilot error and 5.19% to error of other personnel. From these figures, it is readily apparent that pilot and crew training must be stressed. —*Chesapeake Area Aviation Safety Council*

CO_2 Cartridge Explosion—An incident of a mae west CO_2 cartridge explosion in flight has been reported. The mae west was on the floor of the aircraft near a heater vent and the explosion was apparently caused by the expansion due to the heat.—*Whidbey Area Safety Council*

Fast Takeoff Intervals—The use of a dangerously short takeoff interval has been observed at fields in this area. A 3- 4-second interval between aircraft does not permit a takeoff to be safely aborted when necessary. It was recommended that squadrons use a longer takeoff interval, or section takeoffs, to reduce the collision hazards.—*ComFAirJax (NAS Council Southern)*

Excerpts from some of the Navy's 88 Safety Councils throughout the world, who provide local leadership and emphasis to the naval aviation safety program.

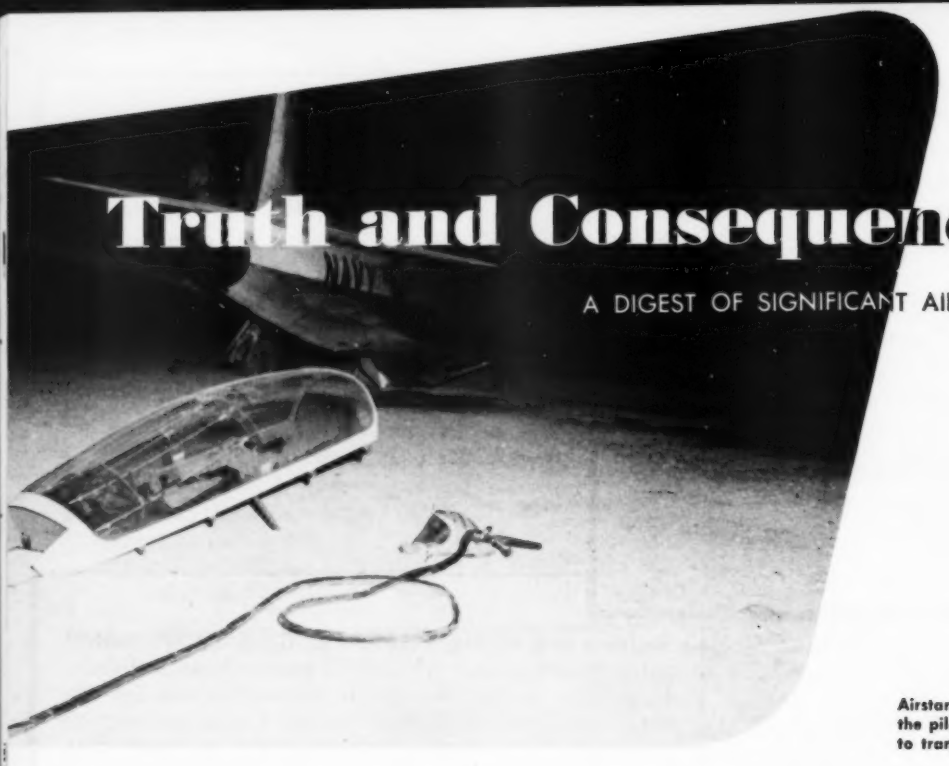
Accident Rate vs. Flight Hours—Analysis of the accident rates in comparison with flight hours shows a definite correlation of the two exists. Possible causes for this correlation were considered to be: (1) a tendency to relax safety standards when under the pressure of an intensive period of training, and (2) relaxation of maintenance standards during these periods, in an effort to provide aircraft to support the heavy flight program.—*ComFAirJax (NAS Council Southern)*

Complacency Danger in Long Safety Record—The complacency which arises from a long safety record is a menace which can creep over a pilot in the same manner as hypoxia or carbon monoxide poisoning and the only antidote is meticulous compliance with squadron doctrine, safe operating procedures and the principles of sound airmanship. A plane commander must accept nothing but the highest standards of performance from his crew members if the safety record is to be maintained.—*AirTransRon 23*

Pilot's Oxygen Mask Test Stand—An oxygen mask test stand for use by individual pilots was fabricated from the following parts: 51-C5200—cylinder, oxygen; pressure gauge (0 to 3000psi) and pressure reducer (0 to 600 psi): R83-SV-4965FS—recharger assembly portable; R83-ARO-0-616A—regulator assembly, diluter demand oxygen, type A14A; AN-6029-1—flow indicator, oxygen. Additional stands would be fabricated and made available to pilots—*CNABaTra*

Truth and Consequences

A DIGEST OF SIGNIFICANT AIRCRAFT ACCIDENTS



Airstarts were unsuccessful when the pilot failed to wait for his fuel to transfer.

VT

TV

MISMANAGED FUEL—It was a night-syllabus cross-country training flight with a well qualified instructor pilot in the front seat of the TV and a student in the rear. The flight was made with a known discrepancy: the fuselage low fuel warning light was not functioning properly.

During range approach at the destination airport, the engine flamed out while in actual instrument conditions. The instructor took over, gang-barred the fuel switches, and commenced a glide toward the field. They broke out VFR 5600 feet above the terrain.

Two airstarts were attempted while descending but were unsuccessful. Concentration was then shifted to flameout approach. Lowering the landing gear was delayed until 90 degrees to the runway on final. The gear only partially extended, and on touchdown, the starboard main mount collapsed.

During the investigation it was noted that the wing tiptanks were empty, but the fuselage tank was full and the wing group and leading edge tanks all contained fuel. This indicated the flameout was due to fuel starvation when the fuselage and tiptanks ran dry, and that during the approach, after the wing group and leading edge switches had been turned ON the fuselage tank had refilled.

The airstarts had been attempted before fuel transfer had taken place. There were 220 gallons of fuel aboard when the flameout occurred.

The pilot's statement contained the recommendation that in the event of a flameout, the dual pilot be utilized to control the aircraft, while the pilot concentrate on determining the cause of the flameout and executing airstart procedures.

VT T-28

THREE—GREEN, THE HARD WAY—After making three normal touch-and-go landings the student pilot and instructor of a T-28 executed a waveoff on the fourth approach when another aircraft made a full stop landing ahead of them.

Going around again, the student, in the front seat, failed to retract the landing gear until the aircraft was in the downwind position where the gear is normally placed down. Immediately afterwards, the instructor directed the student to lower the gear.

The student placed the gear control handle in the DOWN position and assumed the gear to be down-and-locked because the gear warning horn did not sound and the warning light in the gear control handle did not illuminate. Neither the student nor the instructor checked the instrument panel gear indicators. The approach continued with the instructor giving corrective instructions over the interphone system.

Shortly after passing over the end of the runway, with the tower vainly blinking a red light, and where no runway wheels watch as posted, the airplane settled and the propeller contacted the runway in a slightly nose-up attitude, striking the paved surface at intervals over a distance of 790 feet.

The propeller then disengaged itself from the engine and passed under the airplane to make a moderate slice in the airframe. At *this* point the airplane ballooned back into the air sufficiently high to permit the instructor to take over the controls and slam the gear handle down with such force as to extend and lock the gear before the T-28 settled back to the runway.

No account of the postflight briefing is available.

VT TV/AD

TV, AD MERGE IN MID-AIR—A TV took off from a southern air station for a basic radio range training flight at 25,000 feet. Eight minutes later a pair of ADs departed for a high altitude flight which was to rendezvous at 25,000 feet. Visibility was unlimited with a broken ceiling at 18,000 feet.

On top, the ADs made one rendezvous with the joinup flown on a northerly heading. When the lead pilot signaled for another breakup and rendezvous, the two aircraft were in the control zone of a civilian airfield and near a radio range leg serving the field.

The section leader signaled for the breakup, passed the lead, and broke to the left. As the leader rolled out wings level on a southerly heading, the wingman saw a TV approaching from the left of the leading AD.

There was insufficient time for the wingman to radio a a warning before the images merged. As they did, he saw a large puff of white vapor and the AD dropped straight down, streaming fire. The TV burst into flames and went into a flat spin. The pilots did not escape..

Primary cause of the accident as concluded by the board was the inadequate lookout maintained by both the TV and AD pilots. Recommendations included a requirement for flights which take pilot's attention away from normal lookout scanning to be performed in designated tactical areas and not in control areas.

Air traffic is increasing and the collision possibilities right along with it—especially with the advent of the Gray Ghosts.

- *Free yourself of any false sense of security in both VFR and IFR operations.*
- *Maintain a positive lookout doctrine. This means survey the air as continuously as you do the highway while driving a car. When reading or writing a report in the cockpit, delegate a watch; it's good cockpit management.*
- *Work out improved methods for scanning to cover critical areas at frequent intervals and to avoid boredom.*

Meanwhile, pilots are urged to report all near-misses, and submit suggestions on how to prevent mid-air collisions. Such information can be sent via official channels or Anymouse forms to the Naval Aviation Safety Center.—Ed.

HU HUP

A LOAD-ON—An escort carrier was scheduled to get underway at 1830 and the ship's HUP flew ashore at 1750 to pick up the last members of a working party. Sunset was at 1806 and the winds were calm.

Taking on 4 passengers and gear, the HUP was overloaded

More Accident Briefs on next page.

Truth and Consequences

Continued

60 pounds for sea level operation. However, density altitude at the time was 1200 feet and consequently it was 254 pounds overweight.

Twilight had set in by the time the pilot headed back to the anchored carrier and he noted it required 35 inches of manifold pressure to cruise at 55 knots. Normal cruise at maximum gross weight usually required 29 to 31 inches for 60 knots.

It was 7 minutes before the planned departure of the ship when the HUP commenced a normal approach from abeam the starboard bow. The ship's red deck-edge lights and the white deck surface (dust pan) lights were illuminated. A qualified signalman was assigned to bring the HUP aboard.

At about 60 feet altitude, slightly above flight deck level, the pilot decreased his forward speed to zero just short of the side of the ship. Without translational lift and any ground cushion from the water or flight deck the overloaded HUP hesitated for an instant then started to settle. The pilot attempted to apply throttle to increase RPM but found it already all the way open.

The aircraft backed away slightly and continued to settle. The forward rotor blades struck the starboard catwalk and disintegrated and the HUP fell into the sea, tail-first. All occupants evacuated the aircraft without serious injury but it was found that only the pilot and one passenger had worn lifevests. In his haste to return to the ship on time the pilot failed to check that his instructions to wear lifevests were carried out.

Just after becoming airborne the wingman retracted his gear.

VF **FJ-2**

GEAR RETRACT SIGNAL—As a section of FJ-2s started rolling down the runway on take-off the wingman began dropping behind the leader. The wingman continued his run and lifted his aircraft off the deck at about 120 knots. As soon as he was airborne he pulled the landing gear handle up. The plane was felt to settle slightly but the pilot was unaware that he had contacted the runway.

When the section leader's aircraft became airborne (he lifted his nosewheel slightly at 110 knots and let the plane fly off) he looked toward his wingman to give him a gear-up signal. He saw the wingman trailing 1000 feet astern, high and to the right with his gear already retracted. Squadron SOP required that section leaders raise the landing gear when they are safely airborne *and the wingman will follow suit.*

No damage was noted until the aircraft was returned to the line after the hop. Both main landing gear doors and droptanks were scraped and the underside of the tail aspirator assembly was scraped aft of the tail bumper.

The position of the damage indicated the plane was in an extremely nose-high attitude at the time of contact with the runway. In such an attitude, acceleration would be marginal and added drag caused by the opening of the landing gear doors may have produced sufficient settling to cause damage.

VA AJ-1

DISREGARDED INSTRUCTIONS—After an 8-hour transoceanic flight in an AJ-1, a night GCA approach to a strange field was commenced. Pilot's radio reception on UHF and MHF was intermittent. A hydraulic failure which had occurred several hours earlier precluded lowering the landing gear and flaps by the normal methods.

The GCA runway was situated with high terrain on both sides, including a 1200-foot elevation within 3 miles to the left of the runway. However, both the approach and waveoff could be made over water. Weather conditions at the time of the accident were 300 feet scattered, 1600 feet broken, 8000 broken, visibility 6 miles with light rain showers, surface wind calm.

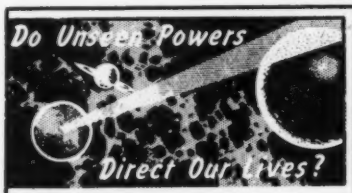
GCA identified the aircraft when at 6500 feet altitude, 15 miles from the field, and turned it on to final at 11 miles with clearance to descend to 1500 feet. Compensating headings were given to the aircraft, and at 6 miles, GCA transmitted the emergency lost communications procedures.

At 3½ miles, the final controller waved the aircraft off with the transmission: "You are too high and too far left for a safe GCA approach. Climb straight ahead, track 340 degree to 2500 feet . . ." The pilot replied, that he was having landing gear trouble. He stated that he was VFR and was going to circle around, VFR, to execute the emergency gear-down procedure. He requested GCA to monitor his turn, but the aircraft image had disappeared from the precision radar due to altitude and was lost in the ground clutter of the search radar.

The pilot later stated that he was reluctant to climb back up into the soup because of the poor radio reception he had been experiencing.

The control tower operator observed the aircraft start a left turn toward the highest ground, and alerted GCA. GCA operator immediately informed the pilot that no turns were allowed in a GCA waveoff, and to climb to 4500 feet on a track of 340. The pilot acknowledged, applied full power and began a reversal turn to the right. Having completed about a 60 degree left turn, the aircraft collided with the ground, 30 feet below the crest of the 1820 foot hill. Two crewmen were killed in the crash and subsequent fire.

CLASSIFIED WANT ADS



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. . .LOOK. . .

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No Upkeep: (Compass was squawked on last two flights)
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No Down Payment: (Forgot checklist left wheels up)
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Searching for additional information on Navy high speed ejections, Aviation Safety Center representatives interviewed the pilot of a F9F-8 who had ejected during a mach boom dive. The events leading up to the ejection and the graphic account of the pilot's sensations are presented here in a condensation of the interview. Lt.(jg.) Gregory's description of his experience makes an impressive addition to the general store of knowledge concerning the problem of survival at sonic speeds.

DURING a series of exercises conducted for Annapolis midshipmen and West Point cadets, a sonic dive demonstration was scheduled by Lt. Gregory's squadron. Target of the dives was a carrier located some 65 miles off the Virginia coast. A generally prevalent haze necessitated cancellation of a strafing demonstration, but although visibility was not ideal, the sonic dives were carried out. Lt. Gregory describes the subsequent events:

Lt. Gregory: ". . . I followed the leader out. We climbed to approximately 30,000 feet. He was to call in and I was to wait for perhaps a 30-second interval and go in right after him, aim right for the ship and pull out at a safe altitude.

"I heard the leader call in, and after 30 seconds I started in. I had 100 percent on. I got on my back and pulled through in a split S type of maneuver and everything was going fine. I hit my mach speed and started slowing out so I could create the boom . . .

"It didn't take long for me to slow down again and pass through the underside of mach one again. Just then I hit the haze and I lost all my horizon.

Please turn the page

From an Ejection Interview with
Lt. (jg) Stanley Gregory, VF-74

MACH KNOCK!

"...that altimeter just kept unwinding...I decided it was time to leave..."

MACH KNOCK

Continued

My visibility was just about gone . . . I lost all sight of the ships. I immediately transferred to instruments and, looking at my gyro, I saw that it was just going from . . . going through all these gyrations that . . . well it was almost impossible to read. I couldn't read it, and I decided to switch to my ball and bank indicator, my airspeed indicator, my altimeter.

"When I saw my altimeter unwinding I knew I was in a steep dive. I didn't exactly know whether I was still on my back—diving on my back, or straight and level. For a moment I caught sight of the ship again. I was fairly low . . . maybe 9000, 8000 feet, I'm not sure . . . I tried pulling out again and instead I just saw that altimeter keep on unwinding. My airspeed was remaining just about the same —over 500 knots. At this point I decided to eject."

Aero-Med: *Was there any particular thing that made up your mind to eject?*

Lt. Gregory: "When I saw the ship again it looked darned close, then I lost it again. I looked at my altimeter and it was passing through about 5000 . . . I decided it was time to leave . . ."

Aero-Med: *Would you describe any sensations that you had prior to ejection?*

Lt. Gregory: "I wouldn't be a bit surprised if I was pulling a lot of G forces, yet I didn't feel 'em. I guess I was in a state of, well, panic . . . that cockpit looked darn cozy and comfortable to me . . . I just felt safe within the cockpit and I guess that's the first thing that shocked me when I pulled the pre-ejection lever and all of a sudden that nice safe cockpit was no longer there. Then I started doing things, but up to that point I just felt as if I could cover my head in that cockpit and everything would be all right."

Aero-Med: *Did you have any trouble in pre-ejecting? . . . any G forces on your arms?*

Lt. Gregory: "None at all—very smoothly and easily."

Aero-Med: *What were your sensations when the canopy left and the air blast struck you?*

Lt. Gregory: "Frankly, it just scared the hell out of me. I felt as if I had crashed through a mountain or something . . . it was just a tremendous noise . . . it was the most frightening experience I ever had, just having that wind blast by me. My thinking process seemed to slow up. All I could think of was pre-eject and pull . . . I couldn't think of the rest of the ejection procedure of 'pre pos ox pull.'"

Aero-Med: *Did you have any difficulty getting your hands up to the face curtain?*

Lt. Gregory: "My coordination seemed rather weak, just lifting my hands to the curtain seemed a great effort . . . they just didn't want to go any farther; if it hadn't been for the windblast catching them and sorta pushing them to the curtain I don't know if I could have reached any further."

Aero-Med: *Was there any problem pulling the face curtain down over your face?*

Lt. Gregory: "No, I was rather surprised at how easily it all happened. I immediately got out of the plane. I don't even remember too much about the explosion or anything. While I was still in the seat I heard the plane explode . . . evidently it hit just a few seconds after I got out. I was still attached to the seat and at this point I pulled my ripcord."

Aero-Med: *What were your sensations when you pulled your chute and nothing happened?*

Lt. Gregory: "At first I was frightened, but when I looked down and noticed my seat still attached, I was just darned mad about the whole thing . . . mad at myself . . . I remember as I was coming down thinking 'after a booboo like this you probably deserve to get everything you're going to get out of it.' I think I started thinking more after I got mad at myself . . . when I was frightened I wasn't thinking . . . just sort of sitting there . . . after I got mad I started doing thinks that were taught to me . . . I did much better after that."

Aero-Med: *Had you practiced or rehearsed how you would handle the situation . . . ?*

Lt. Gregory: "Well I was always sure of the first four stages of it . . . you always see signs up on bulletin boards stating the ways to get out . . . I read of several cases where pilots were found still strapped to their seats . . . but I always thought if it ever happened to me I'd make it a point to unstrap myself . . . I still don't understand why I didn't.

"After I pulled my ripcord and kept falling . . . kept falling . . . I couldn't understand why I kept falling and wasn't slowing down at all. Then I released my belt . . . I don't even believe I had to kick the seat because almost immediately my chute opened."

Aero-Med: *After you ejected, was the seat stable or was there tumbling?*

Lt. Gregory: "It seemed fairly stable. I don't think it was tumbling . . . I couldn't feel any G forces or anything that felt unnatural, just the windblast going by me."

Aero-Med: *As you left the aircraft, did you notice that the windblast threw your arms back or legs around?*

Lt. Gregory: "I can't say for sure about my legs . . . I don't remember my arms being thrown though. I remember hanging onto the face curtain quite a while. Then I distinctly remember letting go of it and then when I pulled my ripcord I didn't have a bit of trouble getting to it."

Aero-Med: *Do you generally wear your chute tight?*

Lt. Gregory: "Generally as tight as possible."

Aero-Med: *Did you have any time to prepare yourself for striking the water?*

Lt. Gregory: "Just before I lost consciousness I saw the water . . . looked as if I was low . . . I don't believe it took more than a few seconds before I hit the water. When I woke up I was swallowing salt water and I started kicking my legs . . . I immediately came to the surface."

Aero-Med: *Were you dragged in the water by your chute?*

Lt. Gregory: "No, I couldn't even see the chute at first . . . evidently it just blew off behind me, and when I took my harness off. I saw it open quite a ways behind me. I knew the first thing I better do was to inflate my mae west lifejacket rather than try and unstrap my chute first . . . this immediately rolled me over on my stomach, kept my head under water, but all I had to do was roll over again and sit on my chute. I could have sat in that position for hours it seemed . . . it was very comfortable . . . very stable."

Aero-Med: *Any trouble unfastening the snaps on the chute?*

Lt. Gregory: "At first I did. I started hurrying through it and found the chute was buoying me up and keeping my head under water so then all I did was relax and turn my back . . . then I was just sitting in the chute relaxed, and unstrapped myself . . . no strain at all. Then I finally pulled the raft out, inflated it and made a few attempts to get in . . . finally decided just to sit there for awhile and rest a little bit more . . . then I got in the raft . . . just waited there until I was picked up by a destroyer."

Aero-Med: *Do you have any comments on the ejection seat or recommendations for modifying it?*

Lt. Gregory: "No, it worked fine for me. I wish I could say just when I hurt my leg. I don't believe it was during my ejection. As far as I'm concerned it certainly saved my life. I don't see where you can improve it in any way."

To Lt.(jg.) Stanley Gregory, for his personal cooperation in making this informative article possible — many thanks! "Mach Knock" occured while he was with VF-74. He is presently stationed at NAS JAX — Ed.

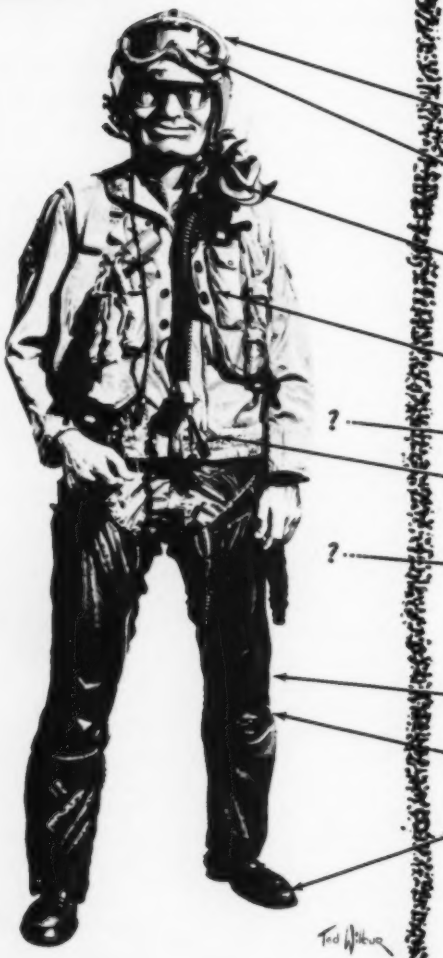
DRESSED TO KILL?

Disapproved

by
APPROACH, the Naval Aviator's Magazine

...for the style-conscious Naval Aviator, a few pertinent comments on several articles of flight gear and how they fit into a bon vivant* Approach *to our way of life

After making a perusal of our LIVE MODEL CLOSET we prevailed upon WILL RISKIT to pose for the illustration (he'll do anything — ONCE . . .). "WILL," we said, "how about putting on your flight gear? We need a shot of a pilot in normal attire for a jet hop." Being the cooperative type, WILL, after several yawns, growls, and much blinking (the lights in the closet had been out) got up and began to rummage around under the sofa, chairs, and coffee urn, and ultimately (forty-three minutes and two cups of coffee later) appeared in his complete regalia. We said: "GASP!", but proceeded anyway. (Of course we had to make a few changes in our prepared commentary . . .)



HELMET – PAINTED IN BRIGHT COLORS . . . STARS, LIGHTNING FLASHES, ETC. NOTE REAL GOOD-LOOKING DOLL ON BACK!!!

GOGGLES – ORDINARILY WILL NEVER WEARS THESE. DARK GLASSES ARE JUST AS GOOD — LOOK MUCH HOTTER. HE'LL NEVER GET A FENCE SO WHY WORRY ABOUT PICKING THE PIECES OUT OF HIS EYES?

OXYGEN MASK – WILL HAD SOME TROUBLE LOCATING THIS. (IT WAS UNDER A LOCKER.) *"Dang thing's no good anyway. Can't breathe through it. All dirty."* MAYBE THAT'S WHY WILL HAS ABORTED MORE HOPS THAN ANY OTHER PILOT . . .

MAE WEST – THIS HAD A HOLE IN IT — *"Got snagged in a door last week. But that's okey. The rigger's due to inspect it next month and he'll probably give me a nice new one."*

LEATHER JACKET – WILL SAID HE DIDN'T HAVE ONE. *"It, er, got stolen . . . I've got a chit in for a new one . . . (Chuckle)"*

SUMMER FLIGHT JACKET – WILL SAYS: *"This is a rare item. Not much good really but it improves my color scheme and looks pretty hot, especially with the sleeves rolled up."* IT'S REAL HOT (. . . CLIMBING OUT OF A FIRE . . .)

GLOVES – *"Say, that reminds me. I better put in for another pair. They look pretty hot, too. Especially in contrast to my tanned muscular arms. I took off my last pair to light a cigaret and they blew away when I opened the canopy to jettison a can of fruit juice they didn't give me an opener for."* NO, WILL, YOU'RE WRONG HERE. IT'S MUCH HOTTER NOT TO WEAR GLOVES. REMEMBER THAT FIRE?

G-SUIT – *"Man. This is one cool article. Even if my legs do sweat a little from it. Makes me look like a science fiction hero. But why'd they put that tail on it? And on the side, too???"*

CIGARET BURN THROUGH BLADDER – *"Boy, did that smell. Whadathey make these outa?"*

SHOES – *"You know, I had a pair of those crazy fuzz jobs but I left them at the golf club. These loafers are my favorites, though, and add a nice dash of brown to my ensemble."* THEY REALLY DASH WHEN THE CHUTE OPENS . . .

Editorial items appearing in this department have been selected from actual samples submitted by stores and flight gear pools. For your protection, their wares has been carefully examined and disapproved by APPROACH's test board for quality, fair value, usefulness or novelty.

THANK YOU, THANK YOU, WILL RISKIT. NOW IF WE CAN JUST PREVAIL UPON YOU FOR ANOTHER SHOT... ONE OF A PILOT HANGING BY HIS THUMBS — IT'LL ONLY TAKE A WEEK OR SO...

NOTES from the FLIGHT SURGEON

AERO-MED INVESTIGATIONS MANDATORY—CNARESTRA

A CNAResTra Instruction has been distributed explaining the importance of psychological investigations in aircraft accidents and amplifying BuMed instructions on carbon monoxide determination and interview of accident survivors.

It was directed in this instruction that in all instances of suspected aircraft cockpit contamination . . . blood samples shall be obtained. Even in incidents where a medical officer's report form is not required, a letter describing the circumstances will be submitted.

CNAResTra, realizing the importance of complete medical officer's reports to aviation safety, states in the instruction: ". . . the Flight Surgeon is directed to personally interview the pilot surviving an aircraft accident. Emphasis should be stressed on the nondisciplinary nature of this interview. Explore fully the sociological, psychiatric, psychological and human engineering factors relative to this accident."

Such appreciation and implementation by a major command for the work of the flight surgeon in the field of accident investigation marks an advance in this aspect of aviation safety.

NO CHECKS, NO WHEELS

This AD-6 pilot did not use checklist for last three items (pitch, flaps and wheels). His custom was to lower gear at break. However, at this time, he was putting his running lights from flashing to steady bright.

His first indication of trouble was sparks from the prop hitting the runway. — Strike one AD-6 in the fire that followed. The pilot escaped without injury.

The flight surgeon recommended that the tower, instead of rogering the wheels-down transmission, might reply with a positive statement such as "please check your gear handle and indicator visually and report in."

The moral is, beware of broken habits!—Ed.

EJECTION TRAINING

CNATra reports several recent instances in which pilots ejected successfully from their aircraft but failed to separate from the seat prior to pulling the parachute rip cord. Until automatic lap belt releases are retrofitted into ejection seats, ejection procedure training must include practice designed to make the release of the safety belt immediately following ejection a natural, reflex action requiring little or no thought by the pilot.

In order to keep students from falling off the seat of the ejection trainer when the safety belt is released, it may be necessary to provide a second belt secured around the chest under the shoulder harness. Pilots be aware of the fifth step to the Pres-Pos-Ox-pull—*Release.*

PILOT CAUTIONS

An F3D pilot reports, "It has been my experience that the right shoulder strap occasionally becomes entangled with the right chute strap on bailout training unless it is grasped in the left hand and swung behind the head and to the left previous to dropping out the escape chute."

Such entanglement could have fatal results in an actual emergency bailout.

CRASH RESCUE INFO

The Columbus, Ohio, division of North American Aviation has published a compact package on crash-rescue information for all NAA aircraft used by the Navy. Mighty good dope for all crash crews to have for study. For a copy, see the local North American rep or write the Columbus Division.

BuAer presents
an answer to the

Burning Question

Aircraft crash fire fighting, always a serious problem in Naval aviation, receives significant improvement in technique, training and equipment as a result of a new BuAer program. No matter what your relationship with flight operations, you will be affected.

"DUE TO shortage of foam, a change of fire fighting trucks had to be made. During this time lapse another fire broke out and became uncontrollable due to lack of foam. The aircraft was completely destroyed . . .

"The loss of this aircraft due to fire is of prime concern to this command . . . had the proper technique been used throughout, this fire might have been extinguished with the equipment available."

Pilots, aircrewmen, crash crews and maintenance crews are all probably aware that such statements as quoted occur all too frequently in aircraft accident reports. For this reason it should be encouraging to learn that this sort of comment is destined for complete or near-complete elimination with the introduction of a new program of crash fire fighting.

The Navy's answer to a problem of long-standing seriousness should be impressive to a lot of people who will be directly affected. It should be of particular interest to you, the pilot, who might be on the inside looking out at the crash equipment coming across the field to your assistance. It should be pretty important to the plane captain and maintenance personnel who "own" the airplane out there on the runway. It should be very significant to the members of the crash crew having the

responsibility for crash rescue and fire fighting.

Here's how the Bureau of Aeronautics is materially increasing *your* chances for survival in an aircraft crash by reducing the element of post-accident damage.

To initiate this new crash fire and rescue program, BuAer Instruction 11320.3 reorganized fire fighting responsibilities at Naval and Marine air stations. Significant feature of this new look is the assignment of responsibility for technical administration of the crash fire crew *and* the structural fire crew to a qualified civilian fire chief. (For the purposes of non-technical administration by the security officer and the operations officer, the structural fire crew is assigned as an organizational part of the security department and the crash fire and rescue crew is assigned as an organizational part of the operations department.)

In his new role, the civilian fire chief will provide a continuous on-the-job training of personnel in fire fighting techniques, fire prevention, operation and maintenance of aircraft fire fighting and rescue equipment. In this way, a solution is found to the serious problem of furnishing adequate training despite a rapid turnover of personnel. Structural fire fighting operations will continue to be performed by permanent civilian personnel.

Where the structural and crash branches are housed in separate quarters, each platoon of the crash fire branch will be under technical supervision of a civilian crash captain, with civilian driver-operator in charge of each crash truck.

Military personnel assigned to the platoon will have an appropriate petty officer assigned for military control.

For any one who has been closely associated with such operations, whether from the critically intimate "cockpit viewpoint" or from an interested observer status, it is obvious that the vital key to this program is—training.

To guarantee a continuous, standardized training which will enable the personnel assigned to make the most of the new equipment now available, BuAer has set up a very convincing program.

By the time this article appears, it is anticipated that a conference will be held with the civilian fire chiefs from Naval and Marine air stations attending. During the two weeks conference there will be presented the detailed plans for a training program to be carried out at all air stations. At this time the new USN aircraft fire fighting and rescue manual will be presented. With the benefit of this Manual, BuAer Instructions, and techniques of the Navy aircraft fire fighting and rescue training course outline under their fire hats, the individual fire chiefs will be equipped to establish and supervise the finest training ever available to air station fire and crash crew members.

For those who recall the World War II vintage fire trucks which, until recently, have been the principle air station equipment, there is

please turn the page

Without proper training and techniques, dollars can literally "go up in smoke."

An uncontrolled crash fire can menace an entire ship.

Burning Question

Continued

more encouraging news. As a part of its new program, BuAer has procured 275 new special trucks for aircraft fire fighting and rescue duty which have already been delivered to continental and overseas bases.

The new type trucks, the MB1 and MB2, carry crews of five and three respectively, and provide a fire fighting potential never before equalled. The MB1, for example, is capable of covering a burning aircraft with 12,000 gallons of foam in two minutes. This 17-ton vehicle can attain a speed of 64 miles an hour and possesses a mud and sand mobility equal to the finest Army combat trucks. Featuring two independent foam generating systems, the MB1 can, through its manually operated turret nozzles, throw variable patterns to a range of 180 feet.

The MB2, a lighter model, also offers a versatile combination of water and foam and is designed for speedy service over difficult terrain.

The Type MB5 crash and rescue truck is under contract with delivery anticipated during the fall of 1956. The GVW is 15,000 lbs. mounted on a 4x4 chassis and powered with a 200-hp. 8-cylinder engine rear-mounted. The truck will carry 400 gallons of water and 25 gallons of foam. A special insulated body, equipped with bus doors, hose reel, bayonet piercing nozzle, 2-way radio, search light and flood lights.

All valves, hose line, pumps, plumbing controls and liquid tanks are located inside a single roomy van type body. The Navy new dry chemical extinguishing agent will be included. A separate gasoline auxiliary power unit to recharge batteries and operate a power saw for forcible entry. This provides accessibility for servicing, simplifies winterization, and affords more comfort for the crew.

Even the newest fire fighting equipment is ineffectual without proper training and techniques.

To be included as standard equipment on these trucks are special crash tool kits containing a complete set of specially designed items for forced entry, cutting and rescue.

The distribution of this new mobile equipment is based on such factors as the mission of the air station, and the number and kind of aircraft based thereon.

There you have the outline of the procedural machinery and instructions *and* existing equipment which constitute what is perhaps the Navy's most advanced program of aircraft crash fire control. Once the maximum capability of this program is attained, the injury damage potential of aircraft accidents will be

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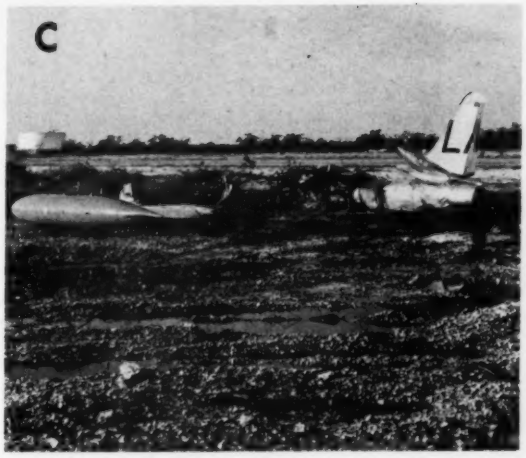


A. Good equipment, properly used, is the real answer to the "burning question."

B. New crash rescue tool kit contains special tools to effect forceable entry into emergency grounded aircraft.

C. . . . Well trained firefighters plus new equipment can prevent needless losses like this.

D. "Snowstorm" from MB1 can reach far out to quench a fire.

E. Foreknowledge of aircraft crash entry points means vital seconds saved.

Burning Question

Continued

materially curbed—if you the pilot, and you the ground maintenance and crash crewmen contribute to the system the necessary effort to make that system realize its value—to you.

To obtain these results, demand of the system the effectiveness possible, and demand of the participation of which you are capable—it's entirely possible that one of the many lives to be saved may be *yours*.

A 5-day course in aircraft fire fighting is available to crash crews at Navy, Marine and Coast Guard stations where commanding officers make such requests. The Naval Air Mobile Training Detachment, headquartered at NAS Memphis conducts this training on a worldwide scale. Its mobile trainers visit nearly 100 air stations annually.

Our thanks to Mr. Carl F. Dreesen of BuAer (SE-743) and E. W. Butler, ADC, of NAMOTRAINER (FF) 3003 for supplying material for this article. — Ed.

Around the clock, around the world, the need for efficient crash fire fighting is never ending.

FIRE FIGHTING REFERENCE SOURCES

NavAer 00-80C-501	General Procedure for Aircraft Crash Fire Fighting and Rescue	
00-80R-14	Aircraft Fire Fighting and Rescue Manual	
00-80T-46	The Airman's Handbook	

BuAer Inst. No.	*Subject*	*Date*
11320.5	Cleaning Navy & Marine Fire & Crash Rescue Vehicles	25 Oct 55
11320.4	Aircraft Fire Fighting & Rescue Training Course Outline	24 Oct 55
11320.3	Fire Fighting responsibilities at Naval Air Activities; standard organization	28 Sep 55
11320.2	Full-time structural fire fighters; policy concerning	7 Oct 54
11320.1	Use of dry chemical fire extinguishers	10 Jul 55
11135.1	Aircraft Crash Fire Report	17 Jul 53
11135.2	Daily Inspection & Preventive line Maintenance Record, Aircraft Crash Fire & Rescue Truck, type MB1	1 Nov 54
1551.2	Technical Research Crash Fire Film No. MG 8261, availability of	8 Aug 55

The following listed instructions are being revised and rewritten:

(1) Aviation Circular letter No. 10-48—27 Feb 1948, subj: Inspection of Crash Rescue and Fire Fighting.

(2) NavAerOO-80C-501—28 Aug 51—Procedure for Aircraft Crash Fire Fighting & Rescue.

From the Ground Up

Notes and Comments on Maintenance

ON THE RISE!

Ground accident rates are the only accident rates currently showing an increase in naval aviation according to statistics compiled by the Naval Aviation Safety Center.

A study of monthly rates for a 20-month period beginning July 1954 indicates a slightly increasing trend as contrasted to recent decreases in the major accident rate.

The type of ground accidents and the numbers for January and February 1956 are as follows:

1. Vehicles colliding with aircraft 20
2. Towing accidents 19
3. Taxi accidents 6
4. Aircraft damaged by fire during ground operation 5
5. Aircraft damaged on jacks while checking landing gear 3
6. Oxygen fire 2
7. Miscellaneous:
   a. Spreading wings without adequate clearance. b. Hydraulic and prop stands falling on the aircraft. c. Cargo falling on the aircraft during loading operations. d. High winds/storms. e. Maintenance personnel injury 38

Total 93

The cost of these accidents is estimated to be $1,456,912.

Particularly noteworthy in view of this record, is the comment of ComAirPac concerning ground accidents caused by negligence: *"The Navy can ill afford to lose the services of aircraft damaged through negligence; replacements are scarce, much valuable time is consumed in repair, training is retarded, and, in terms of dollars and cents, there is no benefit derived from the money expended for this purpose."*

For more details concerning ground accidents see "Can You Stop This" and "Muscles or Missiles" December *Approach*.—Ed.

FROM THE GROUND UP

(Continued)

T28-NOSEWHEEL SHIMMY — A recent accident which involved failure of the nosewheel shimmy damper on a T28-B was determined to be caused by the presence of air due to improper servicing.

North American Aviation Inc., after a review of Handbook Instructions dated 15 September 1955, recommended the following procedures to eliminate air in the damper; these service instructions will be included in revisions of the Maintenance Handbook ANO1-60FGB-2:

Initial Filling Instructions for Damper Assembly

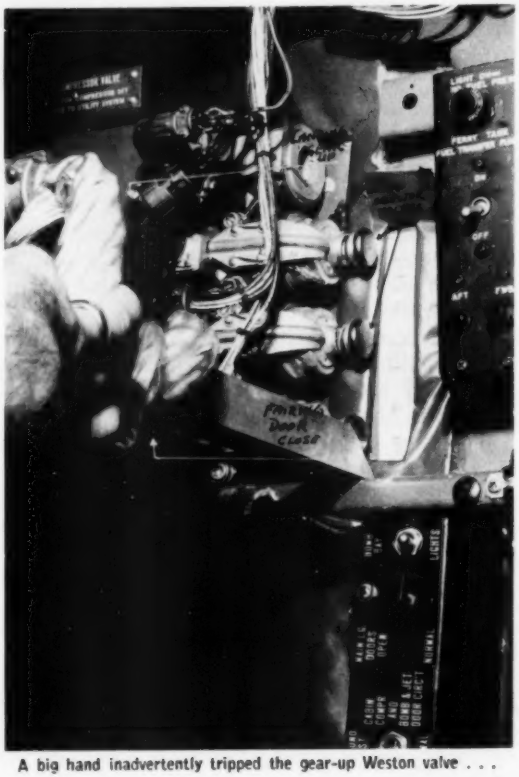
1. Remove both bleeder valves from damper assembly and apply hydraulic fluid (Mil-O-5606 Red) with a hand pump, through one of the bleed ports until clear fluid flows through the opposite port.
2. Connect the hand pump to the alemite fitting and a hose to each of the bleed ports, Submerge the loose ends of the two hoses in a container filled with hydraulic fluid.
3. Elevate the container well above the bleed ports of the shimmy damper.
4. Actuate shimmy damper by turning the nosewheel to the extreme left and right positions several times until no air bubbles are seen rising to the surface of the hydraulic fluid in the container.
5. Remove both hoses from bleed ports and replace bleeder valves. Open the bleeder valve next to the alemite fitting only.
6. Actuate hand pump *very slowly* until hydraulic fluid free of air bubbles flows through the opened bleeder valve. (Note: Hand pump should be operated slowly in steps (6) and (7) or damage to the thermal relief poppet assembly may result.)
7. Close bleeder valve and actuate hydraulic pump until indicator rod is over the "Full" mark on damper.
8. Remove hand pump and replace cap on alemite fitting.

Refill Instructions

1. Open both bleeder valves.
2. Connect hydraulic hand pump to the alemite fitting and actuate very slowly until hydraulic fluid free of air bubbles flows through both bleeder valves.
3. Close bleeder valves and actuate hand pump until indicator rod is over the "full" mark on damper.
4. Remove hand pump and replace cap on alemite fitting.

On the subject of nosewheel shimmy: Recent experiments conducted by the Wright Air Development Center with nosewheel shimmy problems indicated, contrary to popular thinking, that tire flexibility in many cases increased stability and that the basic causes of shimmy could be found instead, in the structure supporting the nosewheel.—Ed.

CASE OF THE BIG MITT—Sometimes the reasons for an aircraft accident can be so peculiar as to be almost humorous, if any accident can be considered humorous. One accident board found this out when they tried to find out why the gear of an AJ folded.



A big hand inadvertently tripped the gear-up Weston valve . . .

During a pre-taxi check the third crewman of an AJ-1 closed the main wheel fairing doors with the emergency Weston hydraulic selector valve. The doors closed alright, but the gear collapsed too, dropping the AJ on its belly.

After the plane was picked up by crane, the wheels were locked down and the aircraft placed on jacks. The crew involved repeated their actions and once again the doors closed and the gear began to retract.

Another crewman was substituted and this time the doors closed and the gear remained down and locked. The operation was repeated successfully 15 times using three other persons. Something was wrong somewhere and the board decided it was not the aircraft. They began a study of the AJ crewman's technique.

The crewman used his right hand in an unusual across-the-body motion to operate the fairing-door-close Weston valve with the thumb and first two fingers of that hand. However, he had unusually large hands and it was discovered that he inadvertently operated the nearby landing-gear-up Weston valve with the meaty part of his hand. When his error was pointed out he was able to operate the desired valve without unlocking the wheels.

F7U AFTERBURNER FLASH FIRES—Several F7U afterburner flash fires have been reported during the past year. Cracked manifolds at the weld, loose B-nuts and afterburner fuel line failure were reported as causes. To provide a more durable afterburner certain changes have been ordered. Engines and log books should be checked to insure incorporation of the following:

J46 Engine Bulletin No. 57 which provides a modified afterburner fuel manifold incorporating leakproof connections to the fuel inlet tubes and a new method of attaching the fuel manifold struts.

J46 Engine Bulletin No. 130 which provides instructions for installing brackets on the afterburner assembly. Afterburner fuel manifold inlet tubes will be retained in the afterburner in the event of a fuel manifold failure.

During routine maintenance inspections or whenever afterburner malfunction is detected, a thorough examination should be made of the complete afterburner section with particular emphasis on fuel lines, connections and associated parts.

ANYMOUSE REPORTS A MURPHY*

*Murphy's Law:

If an aircraft part can be installed incorrectly, someone will install it that way.

"In spite of the fact that I have over 5000 hours in multi-engine aircraft which have steerable nosewheel and that I have several years of testing these type aircraft, I flew a complete test flight with the brakes cross-connected. That is, if I had applied left brake I would have gotten right brake action. Through past experience when taxiing both brakes are applied simultaneously which slows the aircraft so that complete steering is made by the use of the nosewheel steering.

"While testing brakes, both brakes are applied simultaneously in order to determine if equal hydraulic pressure is exerted. I noticed once that the aircraft swerved the opposite direction while I was applying brakes and turning the nosewheel, but because of 30- 40-knot wind I thought it was a strong gust. Upon noticing this situation, I immediately stopped the aircraft and then slowly continued on.

"After thinking the situation over, I advised the flight mech that something might be wrong with the brakes. Sure enough, the ground crew found them cross-connected at the brake selector valve.

"Needless to say, my procedures for testing brakes have been changed to insure proper brakes. That is, the left brake is checked for left turning, and the right brake is checked for right turning."

HOT WEATHER TAKEOFFS

The Naval Air Station, Memphis has placed into effect an instruction which sets forth special requirements for clearance of jet aircraft during periods of hot weather. Whenever the runway temperature exceeds 80°F, the pilot is required to enter the calculated takeoff distance in the remarks section of DD Form 175. When the runway temperature exceeds 95°F, the duty forecaster strongly stresses existing runway temperature during pilots weather briefing and calls attention to temperature at destination when destination is in a hot weather area and/or field elevation exceeds 2000 feet. When the calculated length of takeoff run indicated doubt as to whether a successful takeoff can be made, the clearance is referred to the NAS Operations officer. — *NaTechTraCom*

Watch for more on hot weather takeoffs July Approach.—*Ed.*

SIDE-BY-SIDE FAM HOPS

Checking out a new pilot in a side-by-side seating aircraft, such as the AJ, F3D, AD-5, becomes less expensive if an experienced pilot is assigned to the right seat for at least the first 15 hours of familiarization flying.

An Aviation Safety Center review of 33 accidents in which the pilot had less than 15 hours in the models listed above, showed that 17 accidents could have been avoided or the damage considerably minimized had there been an experienced pilot aboard, even if flight controls were not available to him.

FLIGA REPORTS

The forced landing, incident and ground accident reports required by OpNav 3750.6A are often received late, or not made at all. Forced landings must be reported promptly and investigated thoroughly. It is often possible to learn more from a forced landing than an accident because the aircraft has not been destroyed and is available for study. Also, ground accident and incident reports often point up dangerous practices or conditions that can be corrected.

OMNI

NAS Denver is posting the bearings from Denver omni at the end of its runways. During turnup for takeoff, pilots will be able to check the accuracy of the aircraft omni equipment against the posted bearings.

F4D CRASH RESCUE

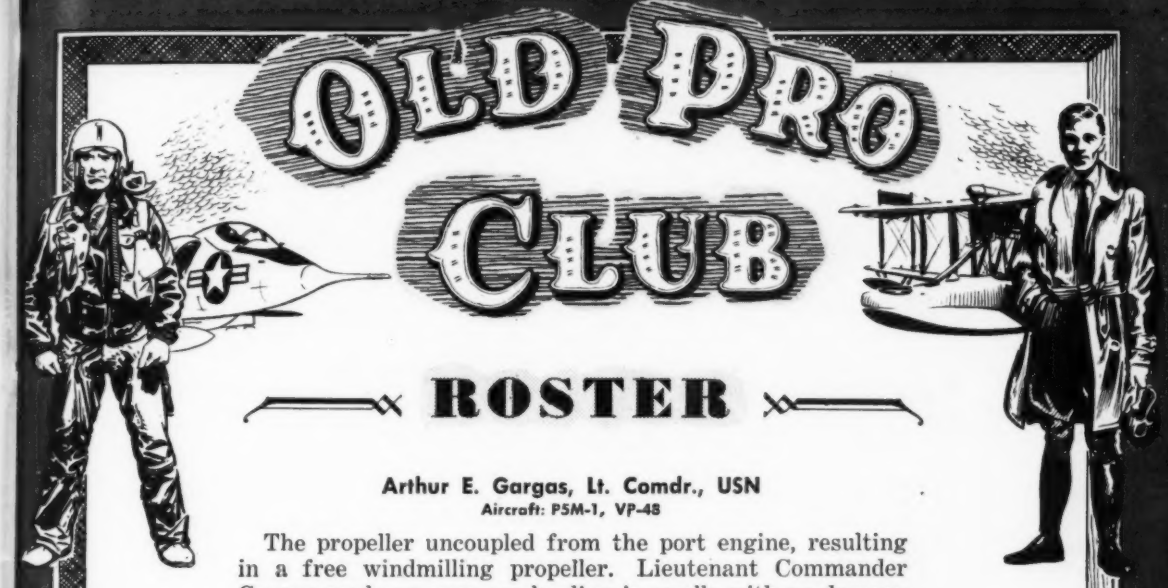
The Douglas F4D Service Information Summary of October 1955 contains several pages of F4D crash crew information. For an extra copy see your local Douglas rep or write Douglas Aircraft Co., Inc., El Segundo Division, 827 Lapham St., El Segundo, California.

AUTOMATIC LAP BELT

BuAer's speedletter of 9 April advises that 1069 pilot's auto-release cartridge-operated seat belts have been shipped to various receiving offices. Some 200 each, for the F9F (ASC 359) go to NAS Alameda and NAS Norfolk. A similar number of FJ kits (FJ ASC 275) go to Alameda and Cherry Point, and 200 F7U kits (ASC 179) go to Jax and 25 to San Diego.

Retrofit of pilots' auto lap belts in remaining aircraft equipped with ejection seats including TV and F2Hs will be accomplished as kits become available. TV and F2H kits will be available early in June.

The Goal is 3.0 in '56!



ROSTER

Arthur E. Gargas, Lt. Comdr., USN
Aircraft: P5M-1, VP-48

The propeller uncoupled from the port engine, resulting in a free windmilling propeller. Lieutenant Commander Gargas made an open sea landing in swells with no damage to the heavily loaded aircraft or injury to the flight crew. He then taxied 63 miles on one engine to a sheltered island where the aircraft was recovered by a seaplane tender.

Joseph W. Entrikin, Lt. Comdr., USN
P2V, VX-6

In the Antarctic, 1000 miles from the base and on the other side of a 12,000-foot ice cap, the aircraft's starboard engine developed trouble. The situation seemed hopeless, but **Lt. Comdr. Entrikin nursed the failing engine, while the** crew jettisoned all unessential weight. Demonstrating exceptional ability and crew efficiency, the aircraft was brought back to the base and landed with one engine feathered.

William G. Shinn, Lt. USNR
Aircraft: HUP-2, HU-2, Det 1

On a routine training flight, at 300 feet altitude and 60 knots airspeed, the helicopter suddenly pitched up violently, followed by an equally violent nose tuck-under. Shinn regained control although the forward longitudinal screwjack had separated, reduced airspeed to 10 knots, and air-taxied approximately four miles over swamps to reach a safe landing area. A slow run-on landing without longitudinal control was made successfully in a 100- by 50-foot clearing.

Recognition of heads-up flying is essential to a positive program of flight safety. Each month, aircrews will acknowledge certain selected individuals whose exhibited flying ability merits membership in the "Old Pro Club." Commanding officers are invited to submit nominations for selection.

Well Done VS-30

In keeping with its policy of reserving Well Done citations for teamwork effort in promoting aviation safety, the Naval Aviation Safety Center seeks to accord proper credit to those units and commands which accomplish impressive safety results in the course of carrying out their assigned missions.

Such a citation is made this month to Air Anti-Submarine Squadron 30, which, during the past 22 months has proceeded about its tasks in such a way as to make safety in flight operations an almost routine achievement.

Since June 1954, VS-30 has amassed a total of 3290 carrier landings, 682 at night, without accident. During this time some 14,019 flight hours were flown in both the AF and S2F. During nine cruises the squadron operated on the MINDORO (CVE-120), ANTIETAM (CVS-36), VALLEY FORGE (CVS-45), SIBONEY (CVE-112) and TARAWA (CVS-40). Under three regularly assigned LSOs, VS-30 qualified 61 pilots in day landings and 42 pilots in night landings.

In achieving these impressive statistics, VS-30 has contributed measurably both to aviation safety and to the increasingly important antisubmarine mission. VS-30 is presently commanded by Commander H. M. PUGH.

The Naval Aviation Safety Center points with pride to the pilots, maintenance and ground personnel of VS-30 as solid citizens of the naval aviation community whose quietly efficient flight operations make aviation safety a routine accomplishment.

Well Done!

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